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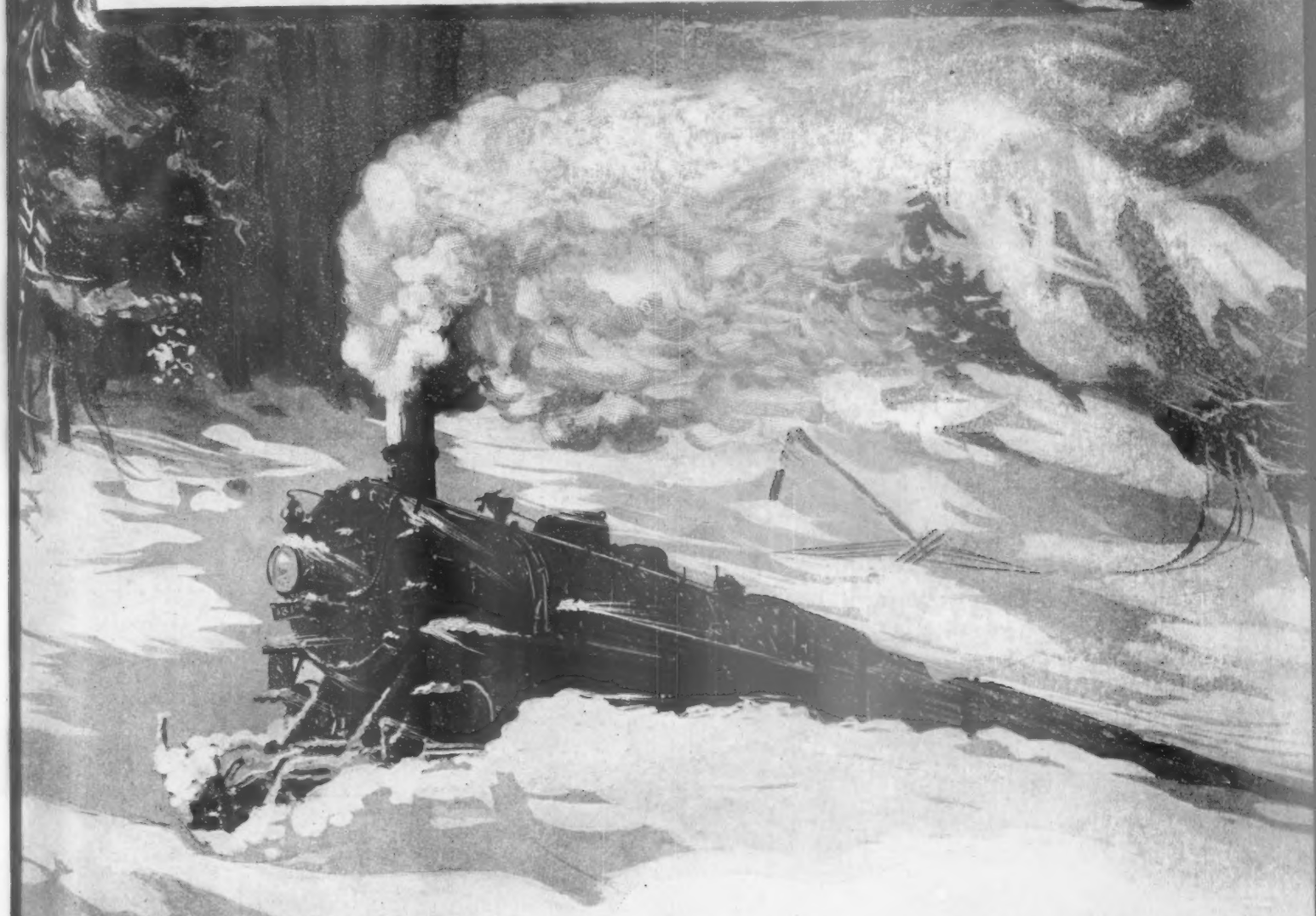
Railway Age

SECOND HALF OF 1922—No. 27 NEW YORK—DECEMBER 30, 1922—CHICAGO SIXTY-SEVENTH YEAR



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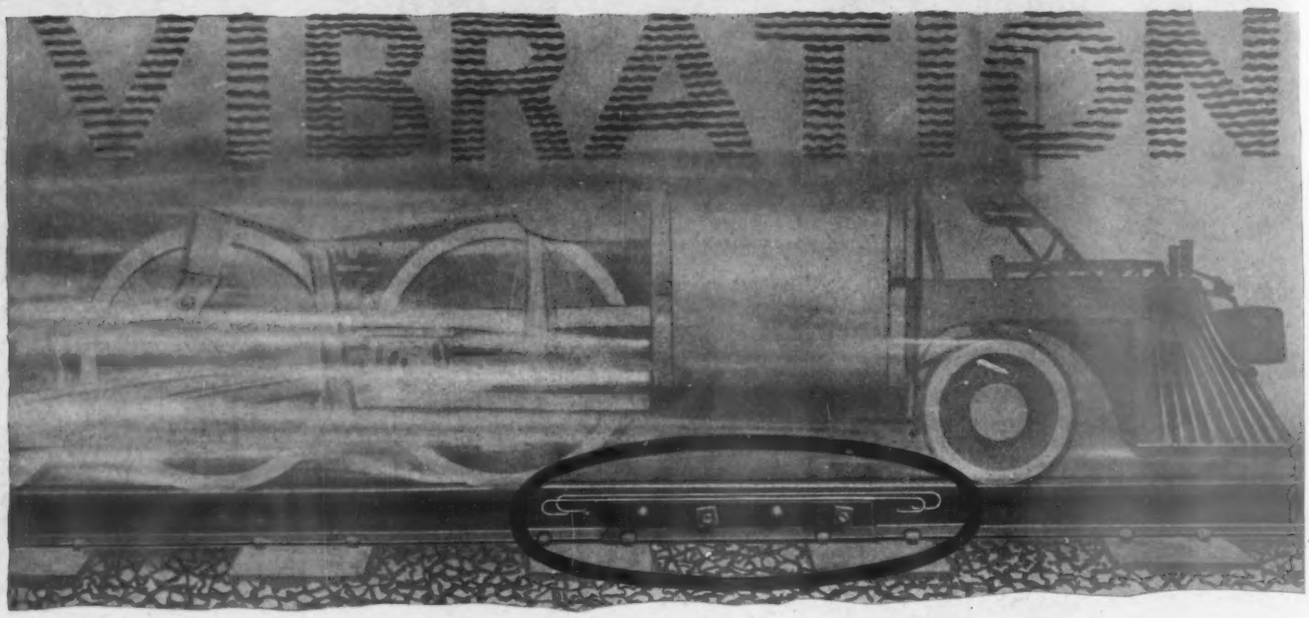

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Volume 73 Number 27

Published Weekly by Simmons-Boardman Pub. Co., Woolworth Bldg., New York, N. Y. Subscription Price U. S., Canada and Mexico, $6.00; foreign countries (excepting daily editions), $8.00, and $10.00 a year, including all dailies; single copies, 25c. Entered as second-class matter January 30, 1918, at the post office at New York, N. Y., under the act of March 3, 1879.

EDITORIAL

Railway Age

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The Lettering of Freight Cars

The number of a freight car (with two, three or four initials indicating the name of the railroad) ought to be plainly lettered on the lower left corner of each side, with distinct horizontal lines above and below. The reader will pardon the dogmatic tone of this sentence when we remind him that it represents a reasonable rule, which was agreed upon by the car-service officers, fourteen years ago, at their convention at Niagara Falls. This simple and useful rule, costing nothing, has been widely neglected. The communication concerning it which appears on another page was accompanied by a lot of pictures showing varied arrangements of lettering, on all sorts of cars. These are new cars, not old ones; and a composite picture of old cars would make a still poorer showing. Also, many roads still show their names (by initials) tiresomely long. Since the organization of the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees, the introduction of long names in the railway world appears to have run wild, and the car-service men are in duty bound to keep up their movement for common sense and brevity. Our correspondent's suggestion of the use of letters to designate the kind of car is interesting, but critical readers would want to see how well he could succeed in getting a hundred or more yard clerks to make regular use of the plan with sufficient persistence and care *to make it a real time-saver.* Some very good clerical plans depend for success on courageous pushing by a determined officer, throughout a term of months or years.

President Rea on Rapid Transit

President Rea of the Pennsylvania in a letter to the mayor of New York and the chairman of the transit commission has called attention to the tremendous growth in passenger traffic within the city limits of New York which the Long Island Railroad has been called upon to carry. Most of this traffic is handled at the Pennsylvania station, the maximum capacity of which is rapidly being reached. Mr. Rea urged the mayor and the transit commission to plan additional subway and elevated rapid transit lines to relieve the burden on the Long Island Railroad. Only excessive capital expenditures, which would probably not be justified in view of the short haul, would enable the Long Island to meet the present and prospective growth of traffic in its territory within the city limits of New York and the problem is one which the public authorities should be called upon to solve. Mr. Rea also called attention to the great areas in New Jersey which are either entirely undeveloped or only slightly so because of the obstacle which the Hudson river places in the way of traffic. He suggested that the proper authorities in New York City should devote their attention to the construction of bridges across the Hudson river, just as years ago they bridged the East river and opened up Long Island to development. If Mr. Rea's letter starts the discussion which it should start, he will have done a real service to the railroads and to the public around New York City. The transit situation within the city as well as the present provisions for suburban passenger traffic are not satisfactory—primarily because little is being done to develop them to meet increasing traffic—and it will not be long before many existing lines will have reached their maximum capacity. The *Railway Age* is of the opinion that some well-thought-out plan for railway and rapid transit extension should be adopted at an early date and provisions made for carrying it out. Such a plan can only result from a full and free discussion of the problem, and it is hoped that President's Rea's letter will bring this out.

Railroad Long Distance Telephone Circuits

Long distance telephone service between division headquarters and important centers is becoming a necessity for the transaction of business on many roads. The demand for such communication is so heavy that many roads are paying large toll bills to the commercial telephone companies while others have seen fit to add through circuits to the existing pole lines. One road has a long distance conversational circuit 457 miles long in service between two large cities, that cost approximately $100,000, which has proved so useful for railroad business that it has been stated that if all the business handled on this circuit was charged for at the commercial rates the line would pay for itself in a year. It may be that if this business had to be handled by a commercial company, a considerable part of the communication would be handled by mail. However, the use of a railroad owned circuit properly supervised will be found the means of settling important questions promptly and will frequently obviate the necessity for traveling; questions relative to important details in all departments may be asked and answered and the work expedited by the use of such a circuit. Especially those roads which are handicapped by a lack of equipment and track capacity should consider the efficient application of telephones as a facility that will earn a high return on the investment in many cases.

Money Talks

The live operating officer is constantly on the alert for means of increasing the efficiency of the transportation service and, at the same time, reducing costs. One way in which this may be accomplished is through the judicious installation of signals or interlocking at strategic locations. Too often the engineering department is asked for estimates on second track work at such locations when automatic signals will postpone the need for such work indefinitely or crossings are left uninterlocked because of the first cost involved in constructing interlocking plants. As a consequence, trains continue to stop at the crossing day after day, with all the loss incident to such stops. In this connection, a signal engineer on one road carried an item of $60,000 on his budget for several years for the construction of an interlocking at one grade crossing location at which an average of 60 trains

had to stop during each 24 hours. The management refused to approve this expenditure, until the signal engineer capitalized these stops on the basis of $1.25 a stop and showed that a saving of $38,000 a year over and above interest and depreciation would result. The management, thinking $1.25 a stop excessive, referred this question to the mechanical department for check, and this department estimated that $1.40 a stop was more nearly correct. The construction of this interlocking has now been approved. The proper use of signal appliances will yield a high return on the original investment and managements should make it a point to consult the signal departments more frequently on ways to facilitate train operation and to reduce costs. Some managements have found that it pays to do this, and all will find that it pays when they come to realize the important place modern signalling holds in present day railroad operation.

Recording Instruments in Power Plants

It is impossible to run a power plant or in fact any kind of establishment economically, without detailed information regarding operation. To get this information in power plants, various kinds of indicating and recording instruments are necessary and can be installed at a cost which is insignificant compared with the possible savings. The possibilities can be appreciated from the fact that there are over 1,200 railroad power plants in the United States, consuming thousands of tons of coal annually, and many of them operated with only fair efficiency. Power plant engineers should not "save at the spigot and waste at the bunghole" by giving all their attention to the engine room. The furnace and boiler deserve first attention, and the efficiency of these important units can be checked by careful use of the flue gas analyzer, differential draft gage and high temperature thermometer or pyrometer. In certain instances these instruments should be of the recording type in order to give warning of conditions which might not be noted at instantaneous readings. In general, draft conditions, furnace efficiency, equality of boiler loading and boiler efficiency can all be improved by a judicious use of the above instruments. In the engine room, steam indicators, recording gages, graphic wattmeters, power factor and other meters perform the same relative function. They afford information enabling power leaks to be located and stopped. Power plant engineers should be assisted to get such of these instruments as they need and be encouraged—if not required—to use them.

New Figures for Old

An interesting and most disconcerting example of the manner in which railroads have a habit of substituting "new figures for old" in their various reports is that of a railroad which in its December, 1920, report showed for the year ended December 31, 1920, a net railway operating income of roughly $7,000,000. In the annual report covering the year 1920, this figure had become a deficit of roughly $1,300,000. One year later, in the December, 1921, statement to the Interstate Commerce Commission, the comparative cumulative figure covering the year 1920 was shown as a deficit of $500,000, and in the 1921 annual report the comparative figure for the year 1920 was shown in a fourth total of $6,000,000, this time a net. Thus, for this road, we have four different figures ranging from a deficit of $1,300,000 to a net of $7,000,000, all of which figures purport to represent the same thing—namely the net railway operating income for this road for the year 1920. Of course, there are good and sufficient reasons why the figures should differ; there may have been the inclusion in some and not in others of certain subsidiary mileage, of federal lapovers, of reserves for maintenance, etc. But, nevertheless, what was this road's net railway operating income in 1920? It is not easy to find out because it is difficult to determine which one of the four figures is the one desired for proper comparison with the figures of preceding or following periods. In this instance, we chose an extreme case, but although extreme, it is somewhat too typical. "New figures for old" represents a confusing and disconcerting condition which the accounting officer, in fairness to those who have to use the figures, should seek to avoid.

Make Every Dollar Count

Programs for second track construction, such as are now under consideration or actually authorized for the coming year, often give rise to the question of simultaneous grade revision, the economy of which is readily ascertained on the basis of the justified added cost to construct on a revised grade, over the expenditure necessary to provide a second track of the same gradient as the original line. A further problem is introduced in determining whether a complete new double-track line shall be built on an independent location or whether it will suffice to build a new single-track line for the uphill traffic, while retaining the old line for the downhill movement. This solution is particularly appropriate in locations where development for increased distance is required to effect the reduction in grade, since the shorter distance on the old line will be of advantage for the downhill movement in spite of the heavier descending grade. Obviously, second track provided in this manner introduces certain disadvantages such as increased cost of maintenance and the possibility of some movement against the prevailing direction of traffic to afford the necessary local passenger and freight service to an occasional station on the old line. In some cases, it also necessitates left hand operation. But in spite of these real or fancied disadvantages, many railroads have frequently found it profitable to resort to the independent second-track line. One notable example of this is the Echo Canyon line of the Union Pacific where the uphill 1.14 per cent line is used on one side of the canyon, whereas the original line on a 1.77 per cent grade on the other side is used for downhill movement. A similar example is found on the Santa Fe's line up the western slope of the San Bernardino mountains. Both of the illustrations cited involve left hand operation. In these days of inadequate railway transportation, when every effort must be made to effect the greatest increase in facilities for every dollar expended, the opportunities to be afforded by such practices as these should not be overlooked.

When There Is a Load for Every Car

The division superintendent comes into more intimate contact with the employees in those departments contributing most directly to the production of transportation than any other railway officer. Because of this fact he has a better opportunity than any other officer to stimulate these employees to greater efforts to the end that more transportation service may be rendered. There is now and probably will continue to be for some time more business awaiting movement than the railways can handle. Therefore every delay that is elim-

inated means that the capacity and the earnings of the roads are increased accordingly. With a shortage of cars of over 110,000 at the last report (December 8) it is evident that there is a load awaiting every car available. The superintendent and his staff can do much by personal contact with yardmasters, agents and yard clerks to show them the importance of their work in detecting and preventing delays to cars by anticipating their release and arranging for their movement promptly and by similar measures. They can show train crews the importance of contributing to the service the railways are rendering the country in bringing cars with minor defects into the terminals where this can be done safely, by picking up cars at outlying sidings at the first opportunity, etc. The maintenance-of-way foremen can be shown the value of their service in unloading as quickly as possible company materials intended for their use. This is a time when every measure which saves a day's delay to the cars adds to the earnings of the road. More than that it means future business for the road, for when cars are scarce every shipper who is served becomes a friend whose traffic will be highly desirable when equipment is more plentiful and freight tonnage offered for shipment scarcer.

C. & O.—Nickel Plate

Details concerning what the Van Sweringens of Cleveland may have in mind concerning their possible acquisition of a large block of Chesapeake & Ohio stock are so meagre that it is hardly possible to get any reasonable idea of what may be behind their plans. The story that has been given out is that they have recently extended an option covering the purchase of the shares at present owned by H. E. Huntington. These shares are not understood to include a majority control of Chesapeake & Ohio, which detail in itself is sufficient to add an additional measure of complication. Just how Chesapeake & Ohio would fit into the Van Sweringen system as it has thus far been assembled, it is difficult to see. The lines at present include the Nickel Plate, the Lake Erie & Western and the Clover Leaf. The Nickel Plate's traffic relationships are primarily with its connections at the Niagara frontier, so it would appear that the Chesapeake & Ohio offers to the system a rather secondary value as an outlet to the Atlantic seaboard. The C. & O. may have a value to the Nickel Plate from the standpoint of giving it a fuel supply, but it is difficult to regard this reason as important enough for so large a step as is proposed in the C. & O. acquisition. The Chesapeake & Ohio business is principally coal which moves east from the New River, Kanawha and Logan districts to tidewater at Newport News, or west and north primarily over the controlled Hocking Valley to the lakes at Toledo, where the Hocking Valley has one of the busiest of the several coal dumping piers on Lake Erie. The Van Sweringen group of railroads has thus far been made up according to the Interstate Commerce Commission's tentative consolidation plan. The three lines—Nickel Plate, Clover Leaf and Lake Erie & Western—were placed in system No. 5, which was given an outlet to New York harbor, a fuel supply through the inclusion of the Wheeling & Lake Erie, etc. The Chesapeake & Ohio was placed in a separate system, No. 8, with its controlled Hocking Valley and with the Virginian. The two systems might be joined, but it is not easy to see what favorable results might be expected to result from that course. In short, the story that the Van Sweringens may secure the C. & O. needs more amplification and explanation before the investing public is likely to be convinced that the acquisition is probable, or, if probable, that it is wise.

Freight Rates and Commodity Prices

THE CHANGES in commodity prices and freight rates which have occurred within the last year suggest some significant reflections and questions regarding the way in which freight rates should be regulated.

When the earliest proceedings for general advances in rates under the present effective system of regulation were begun by the railways about twelve years ago, the railways contended that rates should be based upon what the traffic would bear, as well as upon the cost of rendering transportation service. They showed that increases in prices and wages were increasing their operating expenses. They pointed out that the general increases in prices which were occurring made it easily possible for traffic to bear higher rates and used this as one of the principal arguments for advances in rates.

The spokesmen of the shippers and regulating authorities almost unanimously repudiated and denounced the theory that rates should be based on what the traffic would bear, and that increases in prices afforded any justification for advances in rates. They contended that schedules of rates should be based almost entirely upon the cost of rendering transportation service. They said that all a railway was entitled to earn was enough to pay its operating expenses and taxes and a fair return upon its valuation, and that as long as it did this it had no legal or moral right to complain if its rates were not advanced when prices increased.

The principle of basing rates on the cost of service was applied so rigorously that up to 1917 no substantial advances in rates had been granted, although in that year the average wholesale price of all commodities had risen until it was 76 per cent higher than in 1913. After that, both railway expenses and prices increased enormously. Strict application of the principle of basing rates on the cost of the service required the large advances in rates made under government control in 1918, and again after the railways had been returned to private operation in 1920.

The advance in rates in 1920 was followed by an unprecedented decline of prices. This was not followed for months by a decline of railway operating costs. Suddenly, however, spokesmen of the shippers reversed their attitude. They pointed out that advances in rates and declines in prices had made the rates on many commodities relatively much higher than prices. They took the position, which was exactly the opposite of that which they had taken for years, that the rates should be based on what the traffic would bear, and that rates in general should be reduced because the traffic could not bear them.

The spokesmen of the farmers had previously been foremost in contending that rates should be based on the cost of the service. Because of the unprecedented decline in the prices of agricultural products, they now became foremost in advocating application of the despised principle of charging what the traffic would bear. The Interstate Commerce Commission itself practically abandoned the cost of service principle and in the early part of 1922 ordered reductions in rates which were wholly unjustified upon any principle except that of charging what the traffic would bear.

At the very time the reductions in rates ordered by the Commission were being put into effect, the entire relationship between freight rates and commodity prices was again undergoing a great change because commodity prices were rapidly increasing. The reductions of rates required by the Commission greatly accelerated this change. The latest statistics of the Commission regarding the average railway rate, and the latest statistics of the Bureau of Labor Statistics regarding commodity prices, show that the present relationship between railway rates and commodity prices is entirely different from what it was a year ago. Then, as compared

with conditions in the pre-war year, 1913, the average railway rate was relatively higher than commodity prices. Now, many commodity prices are relatively higher than railway rates. Between September, 1921, and September ,1922, the average rate per ton per mile declined from 1.27 cents to 1.12 cents, or 12 per cent. This left the average rate per ton per mile only 54 per cent higher than in 1913. On the other hand, between November, 1921, and November, 1922, as shown by the statistics of the Bureau of Labor, the average wholesale price of all commodities increased over 10½ per cent, which made it 56 per cent higher than in 1913. The average price of cloths and clothing was 92 per cent higher than in 1913; of fuel and lighting 118 per cent higher; of metal and metal products 33 per cent higher; of building materials 85 per cent higher; of house-furnishing goods 79 per cent higher; of miscellaneous commodities 22 per cent higher; of chemicals and drugs 27 per cent higher; of farm products and foods 43 per cent. The increase in the average price of farm products within the last year has been the most notable, being 18¼ per cent. Farm products are now only 43 per cent higher than in 1913. This is less than the increase in the average rate of the railways of the entire country, but most farm products are produced in the west and shipped to market mainly over the western lines, and the average rate of the western railways is less than 39 per cent higher than in 1913.

Even in September, coal, which normally constitutes about one-third of railway freight, had not begun to move in normal volume, and probably the average rate of the railways for the last three months of this year will show a greater reduction than it did in September. On the other hand, the general trend of commodity prices is upward, and later reports undoubtedly will show further increases in them.

Now that the average railway rate is lower relatively than the average price of commodities in general, and that the increases in prices which are occurring apparently will make it relatively still lower in future months, what attitude is going to be taken by spokesmen of shippers and by regulating authorities with respect to basing rates on what the traffic will bear? Since they took the position so recently that rates should be reduced because they were relatively higher than the prices of commodities, will they in future accept the results of their own recent reasoning and take the position that rates should be advanced because commodity prices are increasing?

That the argument for reducing rates because traffic cannot bear them has been largely destroyed by the changes within the last year is tacitly recognized by the Interstate Commerce Commission in its annual report for 1922. The Commission says: "The tonnage moved by the railroads has been steadily increasing in recent months until at the end of the period covered by this report the traffic is almost equal to the largest ever handled by our railroads. Manifestly the existing rates are no longer interfering with the free flow of commerce as a whole, whatever may have been the situation prior to the reduction of July, 1922." Since this report was written the total carloads of freight handled by the railways has exceeded that handled in the same part of any previous year.

Some of the western state commissions now have pending before the Interstate Commerce Commission proceedings for further reductions of the rates on farm products in which the principal argument they have made has been that the prices of farm products are so low that the traffic cannot bear the rates. What becomes of this argument now that it can be shown that the average rate of the railways serving the very territory which these commissions represent is lower than the average price of farm products? The spokesmen of these commissions seem to be falling back upon the argument that the railways in their territory are making more money than the farmers. But the relationship between railway rates and the prices of farm products shows conclusively that if this is true the inability of the farmers to make money is mainly due to causes other than the relationship between railway rates and farm prices. Furthermore, if, as these very same men were contending a year ago, rates should be based on what the traffic will bear, what bearing upon the question of the reasonableness of the rates has the question whether the farmers or the railways are making or losing more money?

When the Interstate Commerce Commission about a year ago ordered reductions in the rates on grain, grain products and hay, the *Railway Age* called attention to the fact that in doing so it had in that particular case, at least, abandoned its own principle of basing rates mainly on the cost of the service, and had adopted the principle of charging what the traffic would bear. We showed how inconsistent this was with decisions rendered by the Commission in previous years. We anticipate with more than usual interest, in view of the recent changes in the relationship between rates and prices, what the Commission's decision will be in the case now pending for further reductions of the rates on farm products.

Tackling the Problem of Good Will

WHEN A MAN uses the word "railroad" he usually means only the physical property. Railway officers at least should not think and speak of a railroad as merely a thing consisting of right-of-way, roadway, locomotives, cars, shops, terminals and stations. It is also a thing of brains, nerves, flesh and blood. The success of its development and operation depends under present conditions even more upon the development and handling of the human than of the non-human part of it.

It may be said, roughly, that a railway consists one-half of physical property and one-half of brains, manual efficiency and good will. No physical property is worth much in the long run if it has not that intangible asset, which it is impossible to appraise accurately—"good will." A concern to be long successful must have good will among its employees and good will among its patrons. The railways of this country are suffering from deficiencies and inadequacy of their physical properties, but they are suffering much more from lack of good will. In fact, the deficiencies and inadequacy of their physical plants are largely due to want of good will. If there were more good will among their patrons they would be more fairly regulated. If there were more good will among their employees they would be more efficiently operated. If the railways could create more good will among their patrons and employees it would enable them to increase their net earnings much more than would mere improvements and enlargements of the physical plants.

Perhaps the most outstanding characteristic of the management of most large modern industrial concerns, including railroads, is the large amount of study they devote to and money they spend in improving their physical properties and the relatively small amount of work they do and money they spend to increase this intangible but vitally important asset of good will. There is no amount of money that a railway will not spend, if it has it available, to increase the capacity and efficiency of its physical plant. Every railway constantly employs large organizations to study and improve its physical properties. When, however, the importance of doing work and spending money to solve the human problems of the industry is urged upon them, most railway officers are likely to begin looking out of the window. Their minds naturally drift away to the consideration of physical problems. They know that the problems of public relations and employees' relations are vast and unsolved, but their experience and training have had so largely to do with the

tangible, physical problems that they find it difficult to keep their minds for any considerable length of time upon the latter class of problems.

Consider the various associations of railway officers. The number of them that deal with the physical problems of engineering, transportation and maintenance is legion. Where is there any association which devotes itself to reports and discussions on the labor problem? Where is there an association which devotes itself to reports and discussions on the problems of public relations?

Wonderful progress has been made in the solution year by year of the physical problems of the industry. It is high time that the great problem of creating among patrons and employees the good will the industry needs should be attacked with equal courage, energy and persistency.

Need for Co-Operative Research

THE RAILROADS of America have long been recognized as the most progressive in testing new designs and new equipment. No foreign railroad has ever conducted research work on locomotives that can compare with the tests made by the Pennsylvania System at its Altoona testing plant. These have added greatly to the scientific knowledge of the locomotive; they have made it possible to build more efficient motive power, and have benefited not only the Pennsylvania, but railroads all over the world. Other American roads likewise have made important individual contributions in research that have promoted economical and efficient management.

During recent years the railroads have been so hard pressed with the operation and maintenance of their properties that they have not given much attention to testing on a large scale. Furthermore, earnings have been low and the roads have not been able to devote any considerable sum to such purposes. Because of the many innovations that have recently been put into service, or proposed, there is at present a great need for research and the railroads cannot afford to neglect this activity.

The railroads have been criticized many times because they have not adopted some new design or appliance that promised to effect large savings. Some proposals, of course, can be proved worthless without making a single installation. Others have great possibilities. In the latter case, the only effective answer that the railroads make to the critic who advocates something new is to show that they have tested it to find out what it would actually save. In the interests of economy, as well as to avoid criticism, the railroads cannot afford to hold back and wait, hoping that some other road will investigate a new design.

In the locomotive field at present there are many promising innovations. The turbine, Diesel electric and Still-Diesel locomotives, and appliances for producing draft by mechanical means have great possibilities. The railroads individually are not able to make extensive tests of such equipment, and it is hardly right that one should bear the expense when all will benefit by any improvement that may be brought out. The logical way to handle this problem is to have tests made jointly for all the roads, insuring that the work is done accurately so that there will be no question as to the acceptance of the conclusions reached and avoiding duplication which would mean a waste of effort and resources.

Co-operative research has been proposed many times in the past. Several years ago the Mechanical Division of the American Railway Association appointed a committee on this subject, but only perfunctory action has been taken at recent conventions. There has never been as great need for co-operative research as exists at the present time. It is to be hoped that the Mechanical Division will soon take some action that will bring about the utilization of the splendid equipment which is available for working out the many important basic problems that are still awaiting extensive research that they may be satisfactorily solved.

Not Insurmountable

MANY RAILROAD EXECUTIVES and employees seem to be coming to a realization of the foolishness of and the waste caused by the present wall of mistrust and misunderstanding which has grown up between them. This wall, based upon deep-seated prejudices, can only be broken down by the most patient effort and tolerant attitude on both sides. Disaster lies ahead if these misunderstandings are not wiped out. This is frankly acknowledged by many of the railroad executives and also by representatives of the men.

Representatives of the men agree that the interests of the men, the railroads, the public and the investors depend upon introducing a spirit of cordial co-operation into their relations with the managements and having each man feel as if the road he worked for was "his road." They declare, however, that they cannot trust the managements, whose representatives zealously seek every means of taking advantage of them. They will support their contentions with many specific examples. For instance, they say, a rule may be agreed upon, but with no penalties attached. The railroad, when called to account for not living up to the rule, will admit that it is at fault, but go right on disregarding the rule. If conditions are to be bettered, these men declare, the whole attitude of the railroad managements toward the men must be changed, and this must come from the very top of the organization. The chief executive must set a high standard and see that his associates live up to it. If this is not done, they say, the subordinate officers and clerks will in many cases continue to be dominated by a spirit of sharp practice in dealing with the men.

On the other hand, railroad executives will speak just as strongly about the attitude of the representatives of labor and will call attention to many specific ways in which these men have failed to observe what they consider to be the principles of square dealing. In commenting upon recent editorials which have appeared in the *Railway Age*, one chief executive expressed himself in this way: "The attitude of the labor leaders who have been, particularly in recent years, during and since the period of federal control, driving into the minds of the railway employees the propaganda that the employers and those connected with the management are their enemies, and must be dealt with only on that basis, has, to my mind, so prejudiced and embittered the mind of the average railroad man that he cannot be approached on the lines you advocate with any argument or facts that will change his mind. He has been led to believe that he cannot expect any consideration from his employers, but what is forced upon them virtually at the muzzle of the gun (the strike)."

This is a sorry state of affairs. Both sides recognize the seriousness of the situation and yet the mutual mistrust is so great that neither side wants to make a move toward improving the situation. The men, however, declare that the first move is strictly up to the managements.

Conditions can be improved. This has been demonstrated in other industries, when both sides have come to a realization that in the long run questions of relations of the employees to the management can not be settled by force and have decided to co-operate and work with each other to the mutual advantage of all concerned. One of the most striking developments in the railway world during the past year has been the getting together of the managements and the men on the British railways. There is no reason why this cannot be done on American railways. As a matter of fact,

so many of the leaders on both sides are devoting intense thought and study to the question and so many things have already been started by the managements looking toward an improvement of conditions, that undoubtedly the coming year will be notable in this country because of the getting together of the managements and the men on a better basis of understanding.

The Public Should Be Told the Facts

WE HAVE REFERRED frequently in these columns of late to the extreme modesty of the railways in presenting their case to the public. Nowhere is this illustrated better than with reference to the agitation for hard roads which is sweeping the country. Made possible in its early days in large measure by the aid of the railways who saw in this development a system of highways radiating from the railway station, highway construction is now fostered chiefly by the automobile and motor truck interests which have converted the plan into a grand scheme of trunk lines paralleling and duplicating the railways. Not content with this, they have placed the burden of construction and maintenance on the public, with the result that the railways are required to pay a large part of the cost through taxation. The highways having been built, the country is being filled with irresponsible men and concerns that have bought trucks largely on the installment plan, that are unregulated as to rates or character of service, and that contribute little to the upkeep of the highways which they use. The unfairness of competition of this character is so evident that one is at a loss to understand why the railways have not pointed it out to the public.

There is a pressing need for specific information today regarding the true economics of highway development. What investment is a community warranted in making in hard roads from the standpoint of the farmer, the driver of a pleasure vehicle, or the truck operator? What are the relative damages to the highway which each class of service does? What are their relative values to the community? These are typical of the questions which must be answered before motor transportation can take its permanent place in the movement of the nation's traffic. It is doubtful if the highway department of a state or nation can approach the question fairly. Neither is it contended that the railways, which are suffering from the competition of the highways, will be more fair. There is, however, a way of creating an organization whose conclusions can be made accurately. As the principal sufferer, both from taxation and from the loss of traffic, the railways should take the initiative.

In one community in which an extensive investigation was made, the conclusion was reached that the farmer was not warranted in spending over $7,500 per mile for hard roads, and that this amount was sufficient to provide a good gravel road entirely adequate for his needs. Any expenditure beyond that amount should be charged those in whose interests it is made.

The hard road is here to stay. It is an agency of transportation with a definite place. The problem is to so coordinate it with other means of transportation that it may fill this place most satisfactorily and contribute most directly to the welfare of the country.

LEONARD KIPP of Ossining, N. Y., who died last week at the age of 98, was said to have been a commuter on the New York Central for 63 years. He was a passenger on the first train over the road between Ossining and New York. Ossining is 31 miles from New York and it is estimated that Mr. Kipp traveled about 1,500,000 miles.

New Books

American Railroads: Government Control and Reconstruction Policies. By William J. Cunningham, James J. Hill, Professor of Transportation, Graduate School of Business Administration, Harvard University. 408 *Pages.* 5½ *in. by* 8 *in. Bound in cloth. Published by A. W. Shaw Company, Chicago.*

As the preface to this book says, while the volume is intended as a review of railroad events during the years 1917 to 1922, it deals primarily with the period of federal control. The book has 24 chapters, of which 17 relate to the many and varied developments in the two years and two months during which the railways were operated by the United States Railroad Administration. Preceding the 17 chapters are two which serve as introduction and one which deals with the activities of the Railroads' War Board. The four concluding chapters bring the story up to the present. They deal respectively with the Transportation Act of 1920, railroad events in 1920, conditions in 1921 and the situation in 1922. There is also an appendix of over 100 pages. Included therein are the text of the President's proclamation taking over the railroads, that of the federal control act and that of the standard contract. There is also included a paper on the U. S. R. A. operating statistics which is reprinted from the Annals of the American Academy of Political and Social Science.

The book has two assets of primary importance. One is that it is interesting and readable, qualities that appear in books of a technical character infrequently enough so that they are worthy of attention on the part of the book reviewer when they do appear. The second one of the two leading assets is the authoritative manner with which the author handles his subject. One might be tempted to say that the book is a scholarly production, but for fear that the reader might give the word "scholarly" an incorrect interpretation and secure the idea that the book is a bit too learned and heavy which, of course, is far from the case. We may be better content perhaps in pointing out that it is easy to determine that the author is absolutely at home with his facts and that the manner in which the various complicated details or interrelated events are marshalled and co-ordinated makes the story a complete whole. It is easy to follow, and in general the work is so well done as to make one feel that the time spent in reading the book has been expended to good advantage.

This is about the sort of thing, however, that we should expect from a writer of Professor Cunningham's qualifications. We should, indeed, expect a little out of the ordinary from the combination of the practical railroader and the college professor teaching transportation subjects who, in addition, was connected with the Railroad Administration in a fairly prominent capacity. Professor Cunningham was in a position to observe the activities of the U. S. R. A. at close range; he formulated the work of the operating statistics section of the division of operation, was in charge of that section for an extended period, and later served for a time as assistant director of operation.

His official connection with the Railroad Administration might have been expected to lead the author to be lenient with those who directed that organization. While it will be admitted that he is not very severe, it is also true that in no case is he overly lenient. Where criticism is merited, criticism is given, as is notably to be instanced in his chapter dealing with the ill-famed national agreements. His critical comment in that case is fairly typical. Among other things he says:

"Impaired discipline and a general lowering of the morale of the service followed in the wake of the national agreements. . . . It is pertinent to note here that all of the national agreements were entered into on dates subsequent to May 20, 1919, when the President announced that the roads would be returned to their owners at the end of that year. . . . The railroad executives,

therefore, had ground for criticizing the director-general for assuming burdens which these agreements passed on to the railroads while he was unwilling at the same time to assume the responsibility for increasing freight and passenger rates so as to meet the additional expenses."

If one were to make any criticism of the book, it would be contained in the fact that it is rather too short to cover so large a subject, which Professor Cunningham understands so intimately and about which he must have decided opinions. The book adds little or nothing to what we already know or think about either federal control or the Railroad Administration itself. It is intended only as a resumé of what happened and only enough comment is included as is necessary to explain the meaning of the various events or their importance in developments as a whole.

Most of the subjects, except as this objection may apply, seem adequately treated. It is questionable, however, whether the important subject of standardization of equipment merits no more than the meagre five pages which are devoted to it in Chapter VII. Of course, the *Railway Age* had at the time and still has now its own ideas about the U. S. R. A.'s plans for standardization of equipment. We believe that the administration introduced some good designs; that in its publicity it very much exaggerated the value of the standardization idea and that it carried the idea much further than was at all desirable or necessary. Professor Cunningham falls into the error of intimating that the administration standardized on 12 standard types of freight cars and 6 standard types of locomotives of two weights each. He might better have said that there were added 12 new types of cars and 12 (not 6) new types of locomotives to those already in service. He also falls into the error of saying—at least we believe it in error—"Obviously the process of standardization would make the problems of new construction much easier and eventually would reduce the cost of maintenance." The facts are rather that there was a tendency to delay production while the new designs were being worked out. On many roads the problem of maintenance was complicated by the addition of the new designs because of difficulty in getting repair parts for the new locomotives. Of course, the word "eventually" in the sentence helps. In five or ten years there might have been a difference. In 26 months of federal control the Railroad Administration bought 100,000 freight cars and 1,430 locomotives. We wish that Professor Cunningham had pointed out that this represented normal replacements for a period of about 12 months only, or for less than half the federal control period. The U. S. R. A. gave so much publicity to these large purchases that it is worth while to draw attention to this point.

Chapter XX of the book concludes with the following paragraph:

"It is plain, therefore, that nothing definite can be proved from the results of 1918-19. A real test of government operation is possible only if carried on over a longer period—one in which business conditions are normal and which political expediency would have normal play. The period under review would be so abnormal that the results are valueless as guides to what might be expected from a similar control or complete government ownership when normal conditions return."

There are so many of us who will disagree with this conclusion that it is hardly necessary to point out wherein we may disagree. Possibly we can be satisfied with saying that this proves our previous point, that Professor Cunningham is not very severe on federal control.

On the whole, the book is one that no railroad man or student of railway affairs can afford not to read or afford not to have handy in his bookcase. While it is unfortunate that it does not bring any new facts into the discussion or throw any new light on five or six of the most interesting years in American railroad history, it does review what took place in these years in a masterly, authoritative and interesting manner. Therein lies the book's real value.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.*]

Do American Railways Lack the Selling Sense?

WASHINGTON, D. C.

TO THE EDITOR:

The article on page 1039 of your issue of December 2 is more especially woven around the idea of *selling tickets,* but the author is quite right, and I have no criticisms to make except to say that he has not gone far enough, for, in my opinion, it is not too much to say that all of the real problems of the railroads today are essentially problems involving *salesmanship;* and our ills and difficulties are due to an all but universal lack of a *selling sense* on the part of the railroad organizations at the top and all the way to the bottom.

The average railroad man still thinks of salesmen with unconscious superciliousness as mere "drummers"; without the realization which is so obvious nowadays to the rest of the business world, that there can be no real success without salesmanship, and that a lack of it is a form of ignorance which is almost as serious a handicap to a successful business as that of downright illiteracy.

The writer was brought to a clear realization of the depth of this characteristic deficiency of railroad men when seeking, in 1919, for one of the largest commercial concerns in the country, to recruit a corps of *salesmen* with the ability to *sell the conception* of quality and service as against price competition; and the railroad solicitors (who almost invariably credited themselves with "selling service"), with a few exceptions, had but the most rudimentary notion of that real militant, creative missionary spirit which is the essence of true *salesmanship.*

In the aggregate there are probably several thousand of these freight and passenger representatives, intelligent men, who represent their respective companies with dignity, credit and a practical altruism for which there is hardly any other business parallel; and if just half of them really understood and applied real *salesmanship* in their daily contacts, they could easily revolutionize and remold the present adverse sentiment of the nation towards the railroads.

However, even the best salesmen do not get satisfactory results without real *sales managers,* who have the confidence, backing, support and co-operation of the entire official staff of their companies up to the chief executives themselves. The highest compliment that can be paid to the chief executive of a big commercial business is to credit him with *salesmanship* talent, but the chief executive of a railroad usually visualizes himself as a statesman in whom he thinks salesmanship is undignified and out of character.

Theodore Roosevelt was of one type of *"salesman,"* Woodrow Wilson of another, and Lloyd George of still another, but the successes of each were due to their ability to *sell their ideas* to the nation; and it was the same outstanding quality which distinguished George Washington, Thomas Jefferson, Gladstone, and every other great man who has gone down in history.

It is by reason of the absence of salesmanship or "selling sense" that the railroads are in their present predicament,

and unless it be speedily developed the opposition "salesmen" of communistic ideas will inevitably succeed in selling government ownership to the nation, with disastrous results to all concerned.

MOULTRIE HITT,
Assistant to President, American Short Line Railroad Association.

The Lettering of Freight Cars

SAN ANTONIO, Texas.

TO THE EDITOR:

When you are considering the very numerous proposals to save money or to economize in some new way, which nowadays are sprung upon the railroad world almost every day, please remember the freight conductor and the yard clerk. They constitute an important factor in transportation economy. What a saving of time of these men, and consequent speeding up of the departure of trains from the yards, would be accomplished if all cars were numbered uniformly. Each car should show the name of the system owning the car, the car number, with a letter signifying the kind of car; and the capacity, weight and length; all in white lettering on a black background, placed in the same location on every car. This paint should be a standard paint, which would not flake or fade. The lettering should be placed where it would not be liable to obliteration by oil (as is the case frequently now on tank cars), and on the level of the eyes of the average man as he stands on the ground.

Take the Southern Pacific, where my experience has been; there are about a dozen subsidiary roads included in the Southern Pacific System, and each has its own lettering. In making record of the cars in a train, much time is consumed in writing these various initials. It is frequently necessary to scan the whole surface of the side of a car to get the required information. The record of the subsidiary to which the car is credited could be preserved by the serial number. The information whether it was a double deck, a single deck, a box car, or what not, could be designated by a single letter, to precede the number; as "D13123," indicating a double decker. The adoption of this uniform marking plan need not interfere with the carrying of any other advertising designation desired, nor need it require the repainting of the rest of the car. It could be inaugurated at a cost that would soon be absorbed in the time saved, to say nothing of the elimination of errors in car records.

Every conductor knows how a few minutes' delay is frequently stretched into hours. Take a train of sixty cars; a saving of ten minutes means a saving of six car hours; or, in the country as a whole, millions.

The difficulties beginning with the taking of the numbers are multiplied all along the line. Cars are lost because of a mistake in the number; time is lost by the switching crews through difficulty in deciphering numbers and description. There is a record of fatalities caused by car-checkers backing out onto a parallel track in the effort to decipher a number placed at the top of a car.

No railroad is more efficient than its yards. Competent and experienced checkers are put to it to keep the records straight; and experienced checkers are not numerous. When they show signs of ability they are usually promoted to higher places.

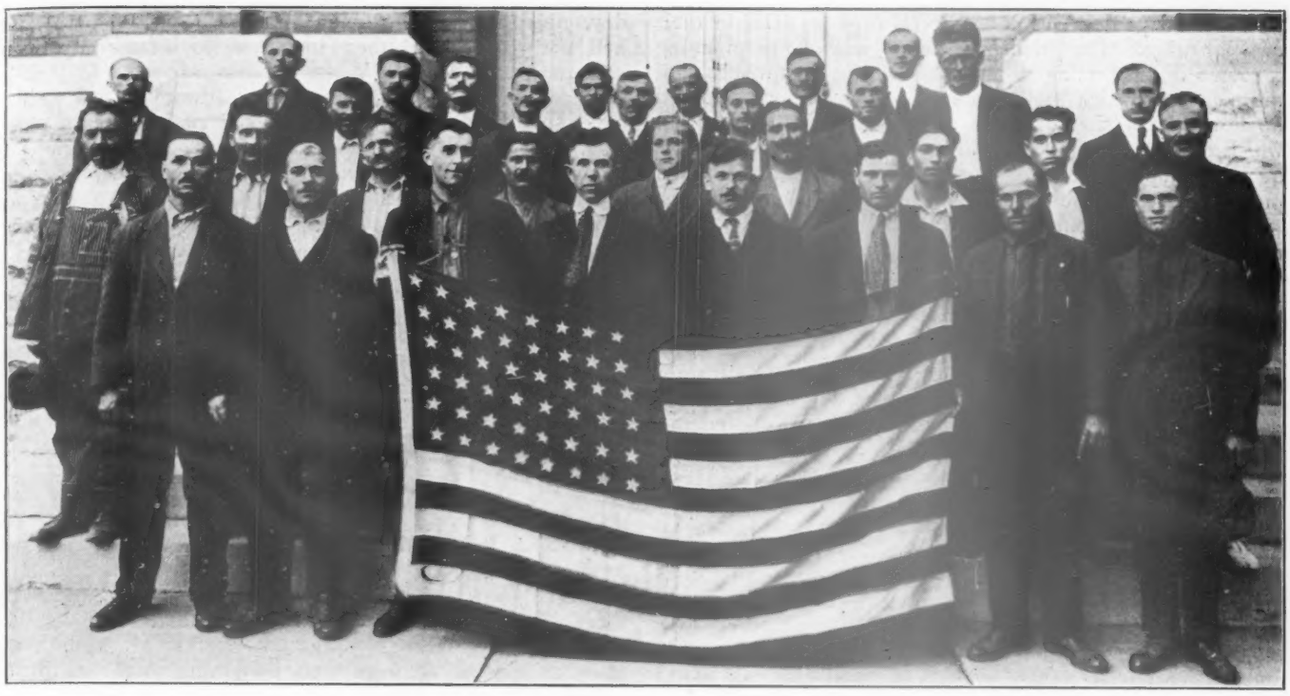
While I am saving minutes, another suggestion may not be out of place. Would it not make for greater efficiency in the disposition of cars at way stations if industries located at such stations were designated by numbers instead of names, frequently long and difficult to decipher? Thus: "S.P. B36860 to spur 6 Sabinal."

If every officer and employee were to be impressed with the fact that every time a train is delayed a minute it means, with a 60-car train, a car-hour lost, there would be fewer car-hours frittered away.

F. J. BAILEY.

Photo by Kadel & Herbert

On the Southern Pacific Between San Francisco and Portland



A Group of Employees at the Court House for Their First Citizenship Papers

Is Education of Trackmen Worth While?

Carefully Systematized Efforts in This Direction Lead One Road to Endorse Such Activities Heartily

DURING the last few years the Chicago, North Shore & Milwaukee has been carrying on a rather unique and decidedly interesting work in its maintenance of way department in the form of an educational movement among the track forces. Unlike many educational movements among workers, regular schools have been established where the men are gathered in classes at regular intervals and are taught how to speak, read and write in the English language as well as about American ways and about the railroad on which they work. Nor is the work limited to these schools, for, in addition, courses of instruction are given for foremen and those who care to become foremen, and social gatherings are provided in which the workmen and their families meet together in wholesome recreational activities. In the opinion of the management the experiment has proved very successful. The foreign workers have entered into the spirit of the work, and the company, originally skeptical, considers itself well repaid in various ways for the attention given this subject.

The Work Began as an Americanization Program

The work was undertaken about two years ago as an Americanization program. The need for something of this kind suggested itself during the war. There were then employed in the neighborhood of 200 trackmen. As on other roads, these men were almost all of foreign birth and all of foreign parentage. Altogether 14 nationalities were represented with Croatians and Italians predominating. As usual they were hired through labor agencies. During the war the attention given to selling liberty bonds to these men and to scrutinizing them in the interest of the government disclosed that they were living in a decidedly un-American atmosphere and were harboring un-American ideas to an alarming degree. It was apparent that little in the way of improvement was being accomplished by the customary practice of working through foremen and labor agencies and that something should be done to overcome the Old World ideas which these men entertained about their work and their relations with their employers.

As an initial step in this direction the practice of keeping labor in boarding camps maintained by contractors was replaced by a system of company camps constructed and mantained to attract the better class of men and keep them contented. An improvement was made in the commissary, baths were provided, close attention given to fumigation and finally a Y. M. C. A. secretary was employed to look after their recreation.

While this work was in the right direction it became increasingly evident, that what the men needed was Americanization and after some hesitation it was decided to encourage and by a systematic course of education to assist these foreign born employees in becoming citizens. To this end a committee was selected, composed of four officers of the maintenance of way department and four foreign track foremen to co-operate with and to advise the Y. M. C. A. secretary in carrying forward the work.

As a first step in the program a complete survey was made to ascertain the educational and citizenship needs of these men. This survey revealed some startling figures. Among other things it disclosed that while more than 88 per cent of the men have been in this country over five years, 90 per cent were not citizens and the remainder had only taken out the first papers. The survey showed further that over 30 per cent of these men, whose ages ranged from 18 to 60 years, and averaged 36 years, could not speak the English language, 75 per cent could not read it, and 80 per cent could not write

it, while 25 per cent could not even read or write in their own language. The problem therefore was one of planning a course of instruction to meet the varying requirements of the men and which at the same time would not be looked upon with suspicion by those receiving the instruction and which could be made accessible to all regardless of the place of their employment. As carried out the plans involved putting up classrooms at convenient points along the line where all gangs could meet on local trains passing their houses. In all about six classrooms were provided, the one illustrated being in an abandoned freight house.

Teaching the Men English

The first step of instructions was that of teaching the men English. For this purpose Roberts' System of English for Foreigners was selected, it being a course of study requiring no interpreter nor any reference whatever to the students' native tongues. Briefly the system consists of placing a series of words on a sheet of paper, with a sentence opposite each word to show how the word is used. On the back of this sheet each of the sentences found on the front is printed to show how it appears when written in long hand. The instructor, by means of his voice, shows how the word sounds and explains its meaning by going through the proper motions. For example, when teaching the word "drop," the instructor points out the word on the paper, pronounces it and then drops something so that the student can connect the sound of the word with the motion indicated. To promote the interest as well as enlarge upon the value of the work to the men, attention was given to tying the instruction up with track work and as a method of keeping the study from getting tiresome use was made of motion pictures at these classes. As the work progressed, English was supplemented with simple courses of study in grammar, government and arithmetic, and here, as in the case of English, the instruction was associated with the work the men were actually doing. For example, in arithmetic, a problem would be given as follows: If 350 ties are unloaded for renewals in track and 85 ties have been renewed, how many ties are left?

Beginning late in 1920, two hourly classes were held on two evenings of each week, excepting for two months during the summer, when the program was confined to pictures and recreational pastimes. Instruction was rendered voluntarily by men in clerical and supervisory positions in the service of the company, and all study was conducted on the men's own time. Early in the campaign it developed that not every foreigner was willing to take up this training, and it was thereupon decided to require all men to attend on the ground that it was advisable from a safety standpoint for all men working on track to have some understanding of English, and foremen were instructed to keep in their gangs as far as practical only such men as could read and write English and were willing to attend schools provided for them. The order had a good effect upon attendance to classes, bringing a number of men into the school who had previously shown no interest, and while it necessitated discharging a few men, it does not appear that those remaining entertained any bad feelings over this order.

Much Interest Was Displayed in the Work

Almost from the start a great deal of interest was taken in the work and creditable progress was made by the men in their studies. As indicating the interest taken in the work by some, one man over 40 years of age, who though many years in this country had not learned the language, said to an interpreter at the close of the first lesson, "I would rather learn English than to have $1,000." Even the men who could not read in their own languages began early to make progress in reading and writing English, and the progress was such that a day in May was selected as "first paper" day, upon which all foreign employees on the road who had not yet declared their intentions to become American citizens, could do so. When the day arrived (May 19), every court house from Chicago to Milwaukee was visited by groups of these men, the day being made quite an occasion. As a result of this, the number of employees not yet having declared their intentions to become citizens dropped to 27 per cent, of which six intended going back to Europe, nine did not as yet understand, and seven refused.

A Foreman School Was Instituted

So successful did the work of the English classes progress, that it was decided not only to continue these classes, but also to establish a school for foremen and all who desired to become foremen. As a matter of fact a survey showed that some of the foremen were almost as much in need of the training as the men under them, and instances were recalled where foremen had been discharged for disobeying instructions, which, as it was found out later, through ignorance, they did not understand. These schools are conducted in the form of a club at which lectures are given on methods of maintaining track. The men are not required to study lessons, but it is required that all foremen send in answers to series of questions discussed in the lectures given them. In addition to studies in track methods, foremen also discuss in these club meetings the relation of capital and labor as well as other subjects pertaining to the railroads and their relation to it.

The Work Has Been Very Successful

At the present time the Americanization program and the larger educational program into which it has grown have been conducted for two years and have proven very successful both from the standpoint of the men and the railroad. The carefully systematized instruction given the track men in the classes, supplemented as it is by family gatherings, has gone a long way not only to enlarge his interest in the work he is doing, but also to readjust his viewpoint concerning American institutions, and while much of the benefit to the railroad is not measurable it has plainly been beneficial from a safety standpoint, has materially reduced the labor turnover and minimized labor difficulties.

All of the schools are now grouped at two locations and it is the intention of the management to continue the courses and thus maintain a close contact with these men, which is possible in such a work. The work is carried on under the jurisdiction of J. S. Hyatt, engineer maintenance of way, to whom we are indebted for the above information.

International

Derailment Near Hyde Park, Boston, Mass.

Salaries of Railway Officers Compared

Only One Salary of $100,000 Shown in Data Submitted at Insistence of Senator La Follette

WASHINGTON, D. C.

A CONSIDERABLE number of prominent railway executives had their salaries reduced during the lean year 1921, while many received increases, according to the compilation of salaries made by the Senate Committee on Interstate Commerce, from which those over $20,000 were selected and published in last week's issue of the *Railway Age*. While the entire list shows many more increases than decreases, most of the increases were in the salaries of the lower paid officers.

A list of the salaries of railroad officers for 1917, compiled by McAdoo's Railroad Wage Commission, was made public in 1918 by Commissioner McChord of the Interstate Commerce Commission, who was a member of the wage commission and who furnished a copy to Congressman Sims for publication in the Congressional Record. The new list makes it possible to show comparisons and the trend of salaries in recent years, because it gives the figures for both 1914 and 1917 as well as for the ten months of 1920 following the return of the railroads and for the first six months of 1921 and also increases or decreases after March 1, 1920. It is difficult to make an analysis of the complete list, however, which takes 241 pages of the printed report, because of the numerous changes made during the course of a year, so that the compensation received for six months does not always represent half of a year's pay, and because of some differences in the method of reporting the figures by different roads. Also, a number of large roads are omitted from the compilation, such as the Delaware, Lackawanna & Western, Erie, Lehigh Valley, Seaboard Air Line, Southern and Union Pacific, Central of New Jersey, while many smaller ones are included.

La Follette Insists on Information

It is understood that this information was furnished by the railroads to the committee at its request on account of the insistence of Senator La Follette, who had threatened to call for the information in a Senate resolution. One of the chief points which the committee was attempting to investigate was the cause of the increase of some $1,400,000,000 in railroad operating expenses in 1920 as compared with 1919, and Senator La Follette was anxious to find in the salary lists something to add to the more noticeable items such as the $700,000,000 wage increase made by the Labor Board shortly after the return of the roads, the wage increases made by the Railroad Administration toward the end of 1919, the increases in cost of fuel and supplies, and the large increase in traffic. The compilation shows clearly, however, that the number of men receiving the larger salaries is very limited.

In the 1917 list the highest salary, and also the only one reaching six figures, was that of Robert S. Lovett, chairman of the Union Pacific, who was credited with $104,000. Judge Lovett's name does not appear in the new list as printed because the Union Pacific report to the committee was submitted in somewhat different form from the other roads, but it shows Judge Lovett as receiving at the rate of $75,000 for 1921 as compared with $100,000 in 1917. It also shows President C. R. Gray as receiving $75,000.

In the present list the highest salary shown is that of Julius Kruttschnitt, chairman of the Southern Pacific, $100,000. He is reported as receiving $75,000 for 1914, $87,500 for 1917, $83,333.34 for ten months of 1920 and $49,999.98 for the first six months of 1921. The next highest in the list is A. H. Smith, whose compensation from five companies of the New York Central System totaled $92,580. Of the 90 chief executives shown in the list (chairmen, presidents, receivers, etc.), as indicated by the compensation reported for six months of 1921, together with notations as to increases or decreases, eight received $75,000 or over. Hale Holden, as president and chairman of the executive committee of the Chicago, Burlington & Quincy, received $60,000, an increase of $10,000 on June 1, 1921, but his salary for the Colorado & Southern had been reduced from $15,000 in 1917 to $10,000. He also received $5,000 from the Fort Worth & Denver City, making a total of $75,000. C. H. Markham, president of the Illinois Central, also received $75,000 in 1920 and 1921 as compared with $60,000 in 1917 and $50,000 in 1914; William Sproule, president of the Southern Pacific, $75,000 in 1920 and 1921, as compared with $61,750 in 1917 and $50,000 in 1914; and E. Pennington, president of the Minneapolis, St. Paul & Sault Ste. Marie, $75,000 in 1920 and 1921, as compared with $53,125 in 1917 and $50,000 in 1914.

Six Receive from $60,000 to $75,000

Six executives were shown to be receiving at the rate of $60,000 to $75,000. L. F. Loree, as president of the Delaware & Hudson, was increased from $25,000 in 1917 to $37,500 on March 1, 1920, and as chairman of the Kansas City Southern from $30,000 in 1917 to $35,000 on March 1, 1920, making a total of $72,500. In 1917 he also received $10,000 as chairman of the Wheeling & Lake Erie. Daniel Willard, as president of the Baltimore & Ohio was reduced from $75,000 to $67,500 in 1921. W. T. Noonan, president of the Buffalo, Rochester & Pittsburgh, was increased from $50,000 in 1917 to $60,000 on January 1, 1921. H. E. Byram, president of the Chicago, Milwaukee & St. Paul, received $60,000 as compared with $75,000 formerly paid to A. J. Earling. N. D. Maher, president of the Norfolk & Western, was increased from $50,000 to $60,000 on January 1, 1921. T. M. Schumacher, president of the El Paso & Southwestern, was increased $10,000 on September 1, 1920, and reduced $10,000 on May 1, 1921, so that his compensation for the first six months of 1921 was $33,333.33.

Eleven from $50,000 to $60,000

Eleven salaries of from $50,000 to $60,000 were shown in the list: W. B. Storey, president of the Atchison, Topeka & Santa Fe, $50,000 (E. P. Ripley received $75,000); J. E. Gorman, president of the Chicago, Rock Island & Pacific, $50,000 (H. U. Mudge received $60,000 in 1914); C. E. Schaff, receiver of the Missouri, Kansas & Texas, $50,000; B. F. Bush, president of the Missouri Pacific, $50,000; Howard Elliott ($40,000 as chairman of the Northern Pacific, and $18,000 as chairman of the committee on intercorporate relations of the New York, New Haven & Hartford); E. J. Pearson, president of the New York, New Haven & Hartford, $50,000 (reduced $2,000 on July 1, 1921); Charles Donnelly, president, Northern Pacific, $50,000; Samuel Rea, president, Pennsylvania ($28,411.65 for six months. In 1917 his salary was reported as $75,000); E. N. Brown ($24,000 as chairman of the Pere Marquette, increased $4,000 on October 1, 1920, and $30,000 as chairman of the St. Louis-San Francisco, increased $6,000 on October 1, 1920, and reduced $6,000 on April 1, 1921); A. T. Dice, president, Philadelphia & Reading $50,000; S. M. Felton, president, Chicago Great Western, $50,000 (increased $10,000 on September 1, 1920).

Five railway executives received $40,000 to $50,000:

J. H. Hustis, president of the Boston & Maine, who received $22,500 for the first six months of 1921, but was reduced from $45,000 to $35,000 on July 1; W. H. Finley, president of the Chicago & North Western, $40,000 ($50,000 for 1917); J. M. Kurn, president of the St. Louis-San Francisco, $40,000; W. H. Williams, $25,000 as chairman of the Wabash, and $17,500 as vice-president of the Delaware & Hudson; J. E. Taussig, president of the Wabash, $40,000.

Fourteen from $30,000 to $40,000

Fourteen received $30,000 to $40,000: Percy R. Todd, president, Bangor & Aroostook, $30,000; W. A. Winburn, president, Central of Georgia, $30,000; W. G. Bierd, president, Chicago & Alton, $36,000; W. J. Jackson, receiver, Chicago & Eastern Illinois, $36,000; W. J. Harahan, president, Chesapeake & Ohio, $30,000 and $6,000 as president of the Hocking Valley; Ralph Budd, president of the Great Northern, $30,000; J. A. Edson, president, Kansas City Southern ($32,000, increased $7,000 on April 1, 1920); Ralph Peters, president, Long Island, $30,000; F. H. Alfred, president and general manager, Pere Marquette, $36,000; W. B. Scott, president, Southern Pacific lines in Texas and Louisiana, $36,000; J. M. Herbert, president, St. Louis Southwestern, $35,200; Charles M. Levey, president, Western Pacific, $30,000; J. J. Bernet, president, New York, Chicago & St. Louis, $35,000; Epes Randolph, president Arizona Eastern, $32,500.

Those receiving $20,00 to $30,000, 18 in all, were: L. A. Jones, president and general manager, Alabama & Vicksburg, $20,000; Henry Walters, chairman, Atlantic Coast Line, $22,800; Marvin Hughitt, chairman, Chicago & Northwestern, $25,000 ($50,000 in 1917); B. A. Worthington, president, Cincinnati, Indianapolis & Western, $20,000; H. R. Kurrie, president, Chicago, Indianapolis & Louisville; J. T. Clark, president, Chicago, St. Paul, Minneapolis & Omaha, $25,000; L. W. Hill, chairman, Great Northern, $25,000; J. S. Pyeatt, president, Gulf Coast Lines, $25,000; W. L. Mapother, president, Louisville & Nashville, $11,660.68 for six months; Morris McDonald, president, Maine Central, $25,000 (decreased $10,000 on April 1, 1921); H. B. Ledyard, chairman, Michigan Central, $25,000; W. H. Bremner, president, Minneapolis & St. Louis, $25,000; C. M. Depew, chairman, New York Central, $25,000; J. M. Schoonmaker, chairman, Pittsburg & Lake Erie, $25,000; J. H. Young, president and general manager, Norfolk Southern, $25,000; W. L. Ross, president and receiver, Toledo, St. Louis & Western, $25,000; C. W. Huntington, president, Virginian, $25,000; O. P. Van Sweringen, chairman, New York, Chicago & St. Louis, $21,000 (increased $6,000 on June 1, 1921).

There were also nine receiving $15,000 to $20,000, 14 from $10,000 to $15,000, and five receiving less than $10,000.

The Southern Pacific, in addition to paying the highest salary to its chairman, seems also to have paid the highest salaries to men other than chairman and presidents. L. J. Spence, director of traffic of the Southern Pacific System, is shown as receiving $26,660.65 for the first six months of 1921, or at the rate of $50,000 a year, as he was increased $5,000 on August 1, 1920, and $10,000 on February 1, 1921. J. P. Blair, general counsel, also received the same amount, having been increased $9,000 on June 1, 1920, and $10,000 on February 1, 1921, and A. D. McDonald, vice-president and controller, also received the same, having been increased $15,000 on August 1, 1920, and $10,000 on February 1, 1921.

The report gives the total amount of increase or decrease in the salaries included in the list (those of $5,000 or more) for each road and also totals for the various years. For example, the Atchison, Topeka & Sante Fe shows increases in the salaries amounting to $5,000 a year or over $120,480 following the return of the roads, and also decreases amounting to $9,800. The total shown in the report for the first six months of 1921 was $767,658.79 or at the rate of $1,535,317.58 a year, as compared with $1,333,968 for 1917. The salaries of the vice-presidents on an annual basis, as indicated by the report, were: E. J. Engel, $25,000; W. E. Hodges, $7,200; A. G. Wells (operating), $30,000; E. Chambers (traffic), $25,000; F. G. Pettibone (G. C. & S. F.), $20,000; S. T. Bledsoe, general counsel, is shown as receiving at the rate of $30,000.

The Pennsylvania Railroad shows increases amounting to $53,205, and decreases of $5,000, while its total for the six months of 1921 was $1,407,602, or at the rate of approximately $2,815.204, as compared with $1,184,459 in 1917. President Rea was shown in the 1917 report compiled by the Lane commission as receiving $75,460. The present report shows $47,742 as his compensation for 1917, but also reports $10,875 for the Pennsylvania Company for that year. For the first six months of 1921 he is shown as receiving $28,411.65, but as all of the subsidiaries of the Pennsylvania are not shown the report does not indicate whether or not his salary was reduced. The salaries of the vice-presidents for the six months of 1921 are shown as follows: J. J. Turner, $13,300; W. W. Atterbury, $15,063.72, as compared with $34,880 for 1917; G. D. Dixon, $11,297.69; Henry Tatnall, $13,557.42; M. C. Kennedy, $9,257.78; G. L. Peck, $11,620.65; Elisha Lee, $14,010.

The report also gives the replies of the railroads to questions calling for the amounts paid "as and for expenses in connection with or upon the account of the compensation, expenses and expenditures of any officer, attorney, publicity agent or employee of such railroad in securing or defeating legislative action or the action of any legislative committee of the Congress or of any state legislature," of the amounts spent "for advertising, pamphletizing or publicity work of any kind or nature" and amounts paid to outside companies for maintenance and repair of equipment during the years 1916 and 1920-21.

In giving the information as to expenses in connection with legislation, most of the roads made no explanations. Others gave the names of various committees or organizations to the expenses of which they had contributed, while others mentioned such items as "matters relating to taxation" or "full crew law repeal," or "attending legislative hearings." Some roads gave a division of their expenses as between "advertising" and "publicity."

International

Railway Station at Coquimbo, Chile, After Great Earthquake

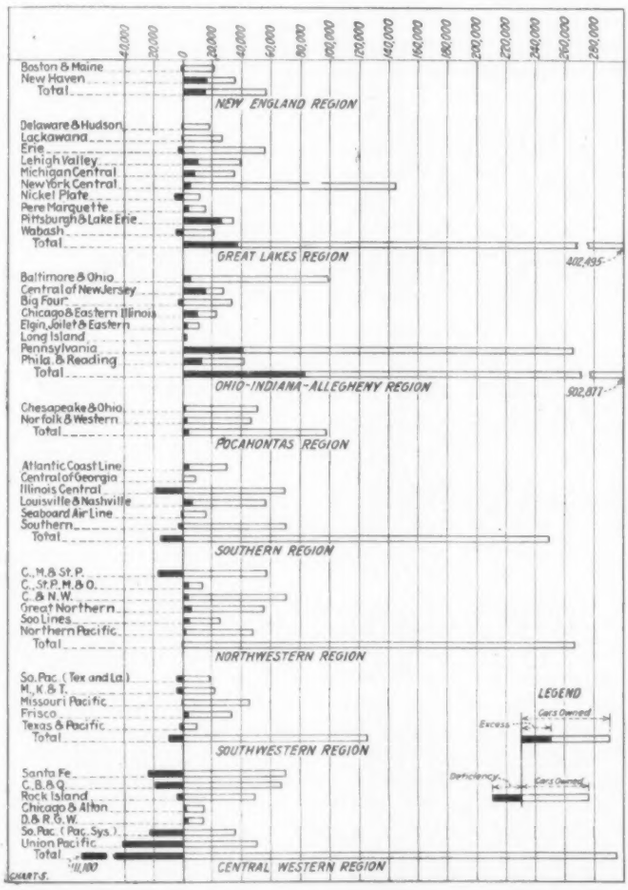
The Distribution of Railway Freight Car Ownership*

Three Bases Are Selected to Study Excess or Deficiency on 46 Leading Railroads

By J. P. Hallihan
Consulting Engineer; Formerly Secretary, Board of Economics and Engineering

THE ORIGINAL THEORY of car ownership in the United States was that each railroad should provide sufficient cars to take care of the traffic offered on its lines.

Freight destined beyond the originating line was formerly transferred at the junction point to cars furnished by the connecting line and the original car was made available for a return load offered by the connecting line or for return



Excess or Deficiency of Car Ownership on Basis of Loaded and Empty Car Mileage During 1920

Cars distributed in same proportion to total cars owned by the 46 systems (1,993,577) as loaded and empty car mileage of the individual road bears to loaded and empty car mileage of the 46 systems. Again taking the Baltimore & Ohio as an example, its ownership was 98,717 and its loaded and empty car mileage for the year was 940,471,000. This figures out at 4.72 per cent of the total empty and loaded car mileage of the 46 systems which in 1920 was 19,916,113,000. Of the total car ownership of the 46 systems—1,993,577—4.72 per cent gives a result of 94,097, or roughly, 94,100. Comparison with the actual B. & O. ownership of 98,717 gives the B. & O. on this basis an excess of approximately 4,600 cars.

empty to the loading point. The rights and responsibilities inherent in individual ownership were thus easily maintained and exercised by the owning company. This is the European system of today.

As transportation facilities were extended by the construction of new lines, difficulties arose. In addition to the delays, breakages and losses attendant upon transfer of lading at each junction point, connecting lines were frequently unable to supply cars promptly for transfer and freight embargoes followed. Large shippers became impatient of these delays and finally furnished their own cars, paying the various railroads participating in the haul on a mileage basis, after the practice of the coal companies on English roads. This opened the door to the formation of private car lines, which offered the shipper specially supervised fast service in the original car to destination, and speedily monopolized the carriage of high-class freight.

The loss in revenue suffered by the railroads forced them to enter into an arrangement for interchange of freight cars on a mileage basis of payment for use under which the roads gradually recovered control of freight traffic, displacing or absorbing all private car lines except those furnishing cars for refrigerator or other special service.

The mileage basis of payment proved defective in that it provided no penalty for undue detention of cars by roads or consignees, and in 1902 it was superseded by the present code of car service rules. Under this code the use of a freight car is paid for at a fixed rate per calendar day regardless of mileage, and the shipper or consignee is penalized by a demurrage charge for undue detention of cars.

During this period of evolution the railroads were obliged to relinquish individual control and to accept the principle of the common use of cars dictated by the commercial advantage of a rapid movement of freight from origin to destination without breaking bulk. The theory of individual ownership remained and it is now proper to inquire into the economic reasons supporting this theory.

A Moral Obligation Easily Evaded

The original requirement that each road should furnish cars sufficient for its originating business was early found to be a moral obligation easily evaded and impossible of enforcement. Roads so situated that they were able to divert empty cars returning to the owning road and load them with freight destined in the same direction were not subject to criticism, since they were complying fully with the car service rules and were, moreover, offering an economic advantage in converting a waste haul into a revenue haul. Feeder lines connecting with more than one trunk line were able to use their competitive position to secure cars.

Nevertheless the business of the country had to be taken care of, not in a restricted manner but to the full measure of the seasonal needs, and the burden has been met by the large systems able to meet it in the expectation that the per diem payments would at least carry the investment. This expectation has not been realized.

For the 15-year period from January, 1907, to January, 1922, the records of the Car Service Division of the American Railway Association show that a surplus of freight cars existed for 162 of the 180 months considered, or for 90 per cent of the time. This surplus exceeded 20 per cent at times, the average, however, on the basis of 2,500,000 cars in service being 156,000 cars or a little more than six per cent. This is not an excessive margin to be kept available for peak business but it is in addition to about the same per-

*The charts and figures used in this article are published by permission of the National Association of Owners of Railway Securities, Inc.

Selected Figures Showing Excess and Deficiency of Freight Car Ownership on Three Different Bases

Railroad	Cars owned[2] (1)	Cars loaded, year ended Feb. 19, 1921[2] (2)	Proportion of cars on basis of car loadings for year[3] (3)	Excess or deficiency on basis of car loadings for year (4) (1) — (3)	Loaded and empty freight car-miles, 1920 thousands[4] (5)	Proportion of cars on basis of loaded and empty car-mileage[5] (6)	Excess or deficiency on basis of loaded and empty car-mileage (7) (1) — (6)	Car-miles per car-day, 1920[4] (8)	Loaded and empty feight car-miles, 1920, thousands (9)	Loaded and empty freight car-days, 1920, thousands (10) (9) ÷ (8)	Proportion of cars on basis of loaded and empty car-days[6] (11)	Excess or deficiency on basis of loaded and empty car-days (12) (1) — (11)
New England Region:												
Boston & Maine	20,847	740,353	40,300	—19,500	221,003	22,100	—1,200	16.6	221,003	13,310	33,300	—12,400
New York, New Haven & Hartford	35,706	834,707	45,300	—9,600	198,179	19,800	15,900	10.6	198,179	18,680	46,700	—11,000
Total for region	56,553	1,575,060	85,600	—29,100	419,182	41,900	14,700	f 13.1	419,182	31,990	80,000	—23,400
Great Lakes Region:												
Delaware & Hudson	18,038	400,509	21,800	—3,800	188,496	18,900	—800	27.9	188,496	6,750	16,600	1,400
Delaware, Lackawanna & Western	26,439	523,554	28,500	—2,100	267,108	26,700	—300	29.5	267,108	9,060	22,600	3,800
Erie	55,703	722,590	39,300	16,400	590,161	59,100	—3,400	26.3	590,161	22,450	56,200	—500
Lehigh Valley	39,569	595,208	32,400	7,200	295,626	29,600	10,000	21.9	295,626	13,500	33,800	5,800
Michigan Central	35,129	433,138	23,600	11,500	273,992	27,400	7,700	20.7	273,992	13,230	33,100	2,000
New York Central	144,655	1,961,069	106,800	37,900	1,400,707	140,200	4,500	a 23.3	1,400,707	62,750	156,800	—12,100
New York, Chicago & St. Louis	11,104	116,188	6,300	4,800	168,627	16,900	—5,800	b 22.9	168,627	7,360	18,400	—7,300
Pere Marquette	17,085	271,150	14,700	2,400	133,720	13,400	3,700	16.2	133,720	8,250	20,600	—3,500
Pittsburgh & Lake Erie	34,160	353,082	19,200	15,600	83,764	8,400	25,800	8.8	83,724	9,520	23,800	10,400
Wabash	20,613	385,295	20,900	—300	252,826	25,300	—4,700	27.0	252,826	9,360	23,400	—2,800
Total for region	402,495	5,761,783	313,400	89,000	3,655,027	365,900	36,700	f 22.7	3,655,027	162,230	405,300	—2,800
Ohio-Indiana-Allegheny Region:												
Baltimore & Ohio	98,717	1,945,500	106,000	—7,300	940,471	94,100	4,600	24.5	940,471	36,900	92,300	6,400
Central of New Jersey	27,476	454,545	24,700	2,800	123,798	12,400	15,100	13.9	123,798	8,900	22,300	5,200
Big Four	32,967	584,347	31,800	1,100	363,456	36,400	—3,400	28.3	363,456	12,850	32,200	800
Chicago & Eastern Illinois	22,709	315,194	17,100	5,600	131,773	13,200	9,500	b 21.0	131,773	6,270	15,700	7,000
Elgin, Joliet & Eastern	10,664	433,633	23,700	—12,800	85,402	8,600	2,300	e 13.0	85,402	6,560	16,400	—5,700
Long Island	2,758	98,281	5,300	—2,500	8,766	900	1,700	e 13.0	8,766	670	1,700	1,100
Pennsylvania System	265,824	4,908,092	267,200	—1,400	2,249,434	225,300	40,500	20.2	2,249,434	111,300	278,200	—12,300
Philadelphia & Reading	41,562	937,616	50,900	—9,300	294,235	29,400	12,200	20.0	294,235	14,710	36,800	4,800
Total for region	502,877	9,677,208	526,700	—23,800	4,197,335	420,300	82,500	f 21.1	4,197,335	198,160	495,600	7,300
Pocahontas Region:												
Chesapeake & Ohio	50,783	731,991	39,800	11,000	496,172	49,600	1,200	35.0	496,172	14,180	35,500	15,300
Norfolk & Western	46,398	799,056	43,400	3,000	441,138	44,100	2,300	34.3	441,138	12,870	32,200	14,200
Total for region	97,181	1,531,047	83,200	14,000	937,310	93,700	3,500	f 34.7	937,310	27,050	67,700	29,500
Southern Region:												
Atlantic Coast Line	29,769	578,236	31,400	—1,500	263,244	26,300	3,500	23.1	263,244	11,400	28,500	1,300
Central of Georgia	8,393	307,256	16,700	—8,300	80,891	8,100	300	g 23.4	80,891	3,460	8,700	—300
Illinois Central	69,141	1,260,976	68,600	500	887,753	88,900	—19,700	40.9	887,753	21,700	54,300	14,900
Louisville & Nashville	56,001	1,190,699	64,800	—8,800	502,972	50,300	5,700	30.6	502,972	16,440	41,200	14,800
Seaboard Air Line	15,838	363,286	19,700	—3,900	171,523	17,200	—1,400	22.4	171,523	7,660	19,200	—3,400
Southern	69,608	1,561,677	85,000	—15,400	732,576	73,300	—3,700	23.7	732,576	30,900	77,200	—7,600
Total for region	248,750	5,262,130	286,200	—37,400	2,638,959	264,100	—15,300	f 28.7	2,638,959	91,560	229,100	19,700
Northwestern Region:												
Chicago, Milwaukee & St. Paul	56,582	1,426,014	77,600	—21,000	738,288	73,900	—17,300	26.3	738,288	28,080	70,300	—13,700
Chicago, St. Paul, Minneapolis & Omaha	12,727	287,718	15,600	—2,900	94,811	9,500	3,200	22.2	94,811	4,270	10,700	2,000
Chicago & North Western	69,838	1,459,471	79,500	—9,700	664,516	66,500	3,300	21.5	664,516	30,880	77,200	—7,600
Great Northern	54,578	835,377	45,400	9,200	495,410	49,600	5,000	26.7	495,410	18,560	46,400	8,200
Minneapolis, St. Paul & Sault Ste. Marie	24,955	398,279	21,600	3,400	210,019	21,000	3,900	26.3	210,019	7,990	20,000	5,000
Northern Pacific	47,200	690,603	37,500	9,700	459,793	46,000	1,200	32.8	459,793	14,000	35,000	12,200
Total for region	265,880	5,097,462	277,000	—11,300	2,662,837	266,500	—700	f 25.7	2,662,837	103,780	259,600	6,300
Southwestern Region:												
Southern Pacific (Tex. & La.)	18,071	298,558	16,200	1,900	230,680	23,100	—5,000	h 23.0	230,680	10,030	25,100	—7,000
Missouri, Kansas & Texas	21,136	372,098	20,200	1,000	254,082	25,400	—4,300	a 23.0	254,082	11,040	27,600	—6,500
Missouri Pacific	44,403	876,428	47,600	—3,300	455,070	45,500	—1,100	22.8	455,070	19,970	50,000	—5,600
St. Louis-San Francisco	32,434	586,807	31,900	500	292,537	29,300	3,200	21.1	292,537	13,870	34,700	—2,300
Texas & Pacific	9,065	249,295	13,500	—4,500	122,349	12,200	—3,100	22.2	122,349	5,500	13,800	—4,700
Total for region	125,109	2,383,186	129,400	—4,300	1,354,718	135,600	—10,300	f 22.4	1,354,718	60,410	151,200	—26,100
Central Western Region:												
Atchison, Topeka & Santa Fe	69,288	1,124,876	61,200	8,100	936,682	93,800	—24,500	a 30.5	936,682	30,720	76,700	—7,400
Chicago, Burlington & Quincy	66,324	1,339,821	73,000	—6,700	858,057	86,000	—19,700	31.8	858,057	26,980	67,500	—1,300
Chicago, Rock Island & Pacific	48,020	825,049	44,900	3,100	526,263	52,700	—4,700	26.7	526,263	19,720	49,300	—1,200
Chicago & Alton	13,822	256,577	13,900	—100	131,903	13,200	600	23.4	131,903	5,630	14,100	—300
Denver & Rio Grande Western	13,405	266,154	14,500	—1,100	110,562	11,100	2,300	20.0	110,562	5,500	13,800	—400
Southern Pacific (Pacific System)	34,584	800,755	43,500	—8,800	578,082	57,900	—23,300	35.5	578,082	16,280	40,700	—6,100
Union Pacific	49,139	747,681	40,600	8,400	909,196	91,000	—41,800	a 52.9	909,196	17,170	43,000	6,200
Total for region	294,582	5,360,913	291,500	2,900	4,050,745	405,700	—111,100	f 33.3	4,050,745	122,000	305,100	—10,500
Grand Total	1,993,577	36,648,789			19,916,113			f 25.0	19,916,113	797,180		

See facing page for footnotes.

centage normally out of service for repairs, and taken alone represents an unused capital investment of approximately $150,000,000. The carrying charge at five per cent, leaving out of consideration the storage tracks required, is $7,500,000, incurred for the common good of all roads but met by the individual owners. There is in addition the loss to all roads in empty car mileage caused by return to owner when surplus, and relocation to loading territory when a shortage develops.

During the latter half of this period an attempt was made to cover the carrying charges by an increase in per diem rates but the rate was again reduced and at times suspended during federal control and the net result of individual ownership has been the inequitable distribution of the burden of equipment costs.

Studied From Several Angles

In an endeavor to ascertain the relative inequality of ownership, the traffic of the year 1920, a year of good business, when all the equipment was in use, has been studied from various angles taking as a basis the performance of the 46 principal systems as derived from the records of the Car Service Division of the American Railway Association. The result of these studies is shown graphically by a series of several charts, three of which are herewith submitted, giving the individual position of each road and the position of the regional groups, as defined (1) in the weekly reports of car loadings, (2) in the loaded and empty car mileage, and (3) on the basis of loaded and empty car days.

The calculation of excess or deficiency in ownership is made in each case on the assumption that the ownership of cars on any individual road should bear the same ratio to total cars in service as its car loadings bear to total car loadings or as its car mileage bears to total car mileage, etc.

Three of the Bases Used in Present Instance

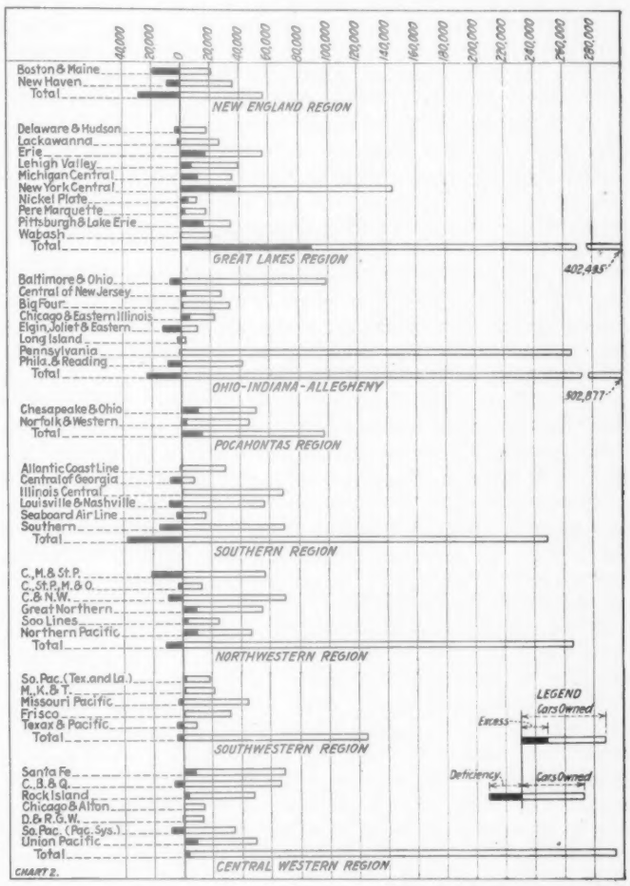
In making an analysis of the situation on each road, it was necessary to consider three principal factors:

1. The requirement of each road and its contribution to the total business of the country expressed by its car loadings.
2. The participation of each road in the revenue derived from the use of the equipment expressed by its loaded and empty car mileage.
3. The character of service performed by each road expressed by the relation of loaded and empty car days to its loaded and empty car mileage.

On the basis of car loadings alone, it appears that with the exception of the Central Western Region—where the roads have enough cars for their requirements—all the other regional groups own less cars than they should be required to own with the single exception of the roads in the Great Lakes Region which, combined, have a surplus of more than 80,000 cars beyond their requirements for originating tonnage. When the comparison is made on the basis of empty and loaded car miles which in a measure is indicative of the revenue derived from the use of equipment, this situation immediately changes. The roads in the Central Western Region show a deficiency in car ownership of over 111,000 cars, indicating that their contribution to the total car supply of the country is very much less than their proportionate share of the benefits derived. The roads in the Great Lakes Region appear on this basis to be in a more normal position, having more than fulfilled their obligations by a surplus of 36,000 cars.

When the comparison is further extended to show the beneficial use of the equipment or, in other words, the comparative rapidity of movement of freight on the various lines as indicated by the figures of car miles per day and loaded and empty car days, the deficiency of ownership shown in the Central Western Region on a revenue basis disappears, the Central Western Region showing almost a perfect balance due to the long haul and low proportion of terminal delays permitting a much faster movement than on other roads less fortunately situated.

Consider the Pennsylvania System which, besides being the road owning the largest number of cars—over 265,000—enjoys a traffic much more diversified than the average, has a great many feeders and connections with other lines, reaches the great terminals on the seaboard as well as the important gateways in the interior and is, in a word, a great collector as well as a transmitter of freight. The charts show that it is keeping up to its requirements on originating load-



Excess or Deficiency of Car Ownership on Basis of Car Loadings for Year Ended February 19, 1921

Cars distributed in same proportion of total cars owned by the 46 systems (1,993,577) as number of cars loaded by the individual road bears to total cars loaded by the 46 systems. Thus the Baltimore & Ohio's ownership for the period was 98,717; its car loadings totaled 1,945,500. The total loadings of the 46 systems for the same period were 36,648,789. The former figure is 5.31 per cent of the latter. 5.31 per cent of the total ownership of the 46 systems—1,993,577—gives a result of 105,859, or roughly, 106,000. This figure compares with the Baltimore & Ohio's actual ownership of 98,717, indicating a deficiency, roughly, of 7,300 on this particular basis.

FOOTNOTES FOR TABLE ON FACING PAGE.

[1] Railway Equipment Register.
[2] Car Service Division, American Railway Association.
[3] Cars distributed in same proportion to total cars owned by the 46 systems (1,993,577) as number of cars loaded by the individual road bears to total cars loaded by the 46 systems (Column 2).
[4] Interstate Commerce Commission figures.
[5] Cars distributed in same proportion to total cars owned by the 46 systems (1,993,577) as loaded and empty car-mileage of the individual road bears to total loaded and empty car-mileage of the 46 systems (Column 5).
[6] Cars distributed in same proportion to total cars owned by the 46 systems (1,993,577) as loaded and empty car-days of the individual road bears to total loaded and empty car-days of the 46 systems (Column 10).
a Average of component parts of system.
b Average for region.
e Estimated.
f Approximate average.
g Average of Atlantic Coast Line, Seaboard Air Line and Southern.
h Assumed to be same as for Missouri, Kansas & Texas System.

ings; that on the basis of revenue derived from participation in handling the total business of the country it has, in fact, exceeded its obligation by a little more than 40,000 cars, but its movement being somewhat retarded by a large proportion of intermediate hauls, on the basis of car days, it becomes again deficient in its obligation of ownership by 12,300 cars.

The New England Roads

Perhaps the most characteristic example of the necessity of considering the three bases mentioned is shown by the New England roads on which traffic moves slowly and experiences many delays at junctions and at terminals. On the basis of car loadings the New England Region has but little more than half of the number of cars required. If its ownership is considered on the basis of its proportionate obligation due to the revenue derived, it appears with an excess of cars which is wiped out, however, by reason of its slow movement, leaving the New England Region in deficiency on any form of average calculation. From an economic point of view this is as it should be, since under normal circumstances more cars arrive in New England with raw material to be converted into manufactures or to furnish power for such conversion or with food products for the population than are required for manufactured products going out, which constitutes the burden of its outbound traffic.

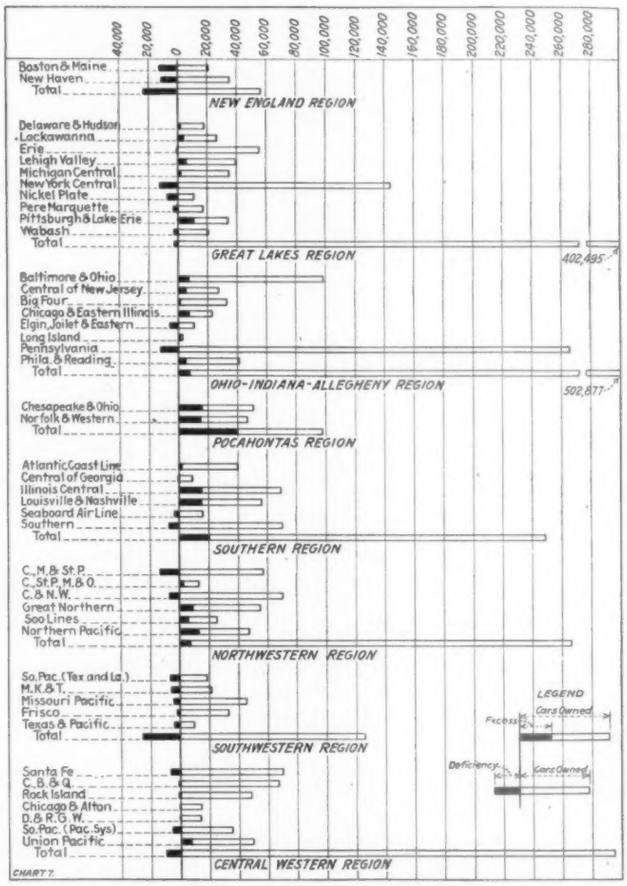
The problem of fair distribution of capital cost of ownership in equipment that is employed, whether individually owned or not, in a common service is quite evidently, from this picture of the situation, not an easy problem to solve. The inherent conditions differ on each road and in each group, differing less between roads in the various groups than between those governing a group of eastern roads and those governing a group of roads in southern or western territory. A short haul coupled with movement in and out of congested terminals has a very important bearing on the movement of freight expressed in car miles per day. Again, the position of a bridge road originating very little freight but receiving freight from its connections destined for points beyond its own lines, giving it the advantage of a long haul with very little terminal switching, permits it to profit from the general business of the country with a very small contribution to the equipment used. In such circumstances, as in New England, it would be an economic loss to compel a road so situated to purchase cars which in time of surplus would come back to its lines for storage, thus creating unnecessary empty car mileage, when the movement of empty cars in both directions over its line furnish it at all times with a supply of cars more than adequate for its needs. Circumstance of location should not, however, permit it to evade its share of the capital cost.

Burden of Ownership Not Now Equitably Distributed

The fact that is brought out very clearly from the analysis is that the burden of ownership is not now equitably distributed, and the question naturally arises whether it is best to attempt equitable distribution on the basis of individual ownership. Certainly it cannot be done without power of enforcing the purchase of rated equipment deficiency by individual roads, and as shown, many of the roads most deficient in equipment on any of the bases considered should not, from an economic standpoint, be permitted to own cars individually so long as the practice obtains of return to owner when surplus. Such equipment, under car service rules, would be located in times of surplus at points where a car supply is not required and would require relocation to loading territory before it could again come into general use.

Coming now to consideration of common ownership as well as common use, it is evident that some thought must be given to the manner of protecting individual ownership in the common supply, and to the possibility of deducing a formula under which each road could thereafter contribute its proper proportion to the capital investment. For example, the present supply of freight cars might be evaluated and equipment certificates issued to cover the whole capital investment, each road receiving certificates for the equipment contributed and subscribing in addition to such amount as would make up its proper contribution or receiving credit for its excess ownership.

Protection of present capital investment offers no difficulty. There is considerable difficulty, however, in determining the excess or deficiency of contribution to the total equipment in service on the part of each road. The base for derivation of



Excess or Deficiency of Car Ownership on Basis of Loaded and Empty Car Days During 1920

Cars distributed in same proportion to total cars owned by the 46 systems (1,993,577) as loaded and empty car days of the individual road bear to total loaded and empty car days of the 46 systems. Thus the Baltimore & Ohio is shown as having an excess of 6,400 cars on this basis. Its ownership was 98,717; its loaded and empty car days were 36,900,000. Total loaded and empty car days of the 46 systems were in 1920, 797,180,000 of which 36,900,000 constitutes 4.63 per cent. This per cent of the total ownership of the 46 systems—1,993,577—gives a result of 92,303, approximately 6,400 less than the actual ownership of 98,717. In other words, on this basis the Baltimore & Ohio has an excess of 6,400 cars.

a formula would appear to be that of benefits derived from use; that is, the revenue derived from the haul of a loaded car as expressed by the relation of the car mileage of the individual road to the total car mileage. This would have to be modified by the requirement for originating tonnage and again by the manner in which the road performed its part of the service of transportation, modified again by the circumstance of location and by the physical conditions of operation under which some roads must work and which are not in evidence on other roads. It seems clear, however, that a reasonable standard of movement could readily be determined for each group, and a premium established for acceleration of movement by individual roads of the group.

The situation is somewhat analogous to the problem confronting a customs smelter receiving various ores, some of which are free-smelting and some refractory.

Within reduction limits, the base rate per ton for treatment is the same for all. Each lot, however, is credited a definite sum per unit for each unit of fluxing elements in excess of the base percentage established and is likewise penalized for each unit of refractory elements above the permissible limit. The adjusted treatment charge expresses the net smelting value of the constituents of the ore.

A similar working formula could, no doubt, be deduced in this case, and be applied monthly or annually, as might be agreed. Standards of movement and values of modifying circumstances could readily be determined for each group by the roads interested, or by a general committee for all roads, as standards are now determined in interchange practice.

There are various maintenance and operating economies that would naturally follow if common interest and responsibility are added to common use of freight cars, but the unfair distribution of the financial burden alone, under the plan of individual ownership, warrants the conclusion that it is not adapted to present-day conditions of operation and should be supplanted by a method sufficiently flexible to ensure that no road would escape its share of the burden of ownership nor be deprived of due credit for beneficial use of equipment.

Agitation for Reduced Rates Termed Menace to Reviving Prosperity

THE Western Railways' Committee on Public Relations, on December 23, issued a statement declaring the reductions of freight rates made within the last year have averaged 12 per cent, and are costing the railways at the rate of at least $471,000,000 annually in freight earnings, and characterizing the agitation, especially in the Western States, for further reductions, as a "menace to the reviving prosperity of the country."

The committee is composed of the following railway presidents: Ralph Budd, Great Northern; H. E. Byram, Chicago, Milwaukee & St. Paul; W. H. Finley, Chicago & Northwestern; Hale Holden, Chicago, Burlington & Quincy; J. E. Gorman, Rock Island Lines; C. H. Markham, Illinois Central; C. E. Schaff, Missouri, Kansas & Texas, and S. M. Felton, Chicago Great Western. The statement, which was given out by the chairman, S. M. Felton, is as follows:

"The present agitation for further reductions of railway rates, which is especially active among the farmers in western territory, indicates a serious want of public understanding of the railroad situation, and is a menace to the reviving prosperity of the country. This want of public understanding will, it is to be feared, be increased by a statement made in President Harding's message to Congress on December 8. This statement is as follows: 'When some very moderate wage reductions were effected last summer there was a 5 per cent horizontal reduction in rates.' The appearance of this statement in the message must have been due to an unfortunate mistake, for, as shown by the latest statistics of the Interstate Commerce Commission, the reduction of rates has been more than twice the amount stated. While railway rates and earnings have been seriously reduced, the prices of all commodities have been increasing.

"September was the first month since the general reduction of freight rates was put into effect on July 1, the facts for which show the full effect of the reductions of rates which have been made within the last year. This is the case because September was the first month after the reduction of rates when the railways handled a normal amount of low grade freight, especially coal. The statistics of the Interstate Commerce Commission show that between September, 1921, and September, 1922, two months which are entirely comparable, the average freight rate per ton per mile in the entire country declined 12 per cent, or from 1.27 cents to 1.12 cents. Few people realize the great effect this has had on railroad earnings. The total freight earnings of the railways of the country from freight business in September alone were $47,773,000 less than they would have been except for this reduction in rates. Based on the freight traffic handled in 1921 the reduction of freight rates within the last year amounts to about $471,000,000 annually.

"The largest reduction in rates has occurred in western territory, because the reductions on grain, grain products and hay have been relatively larger than on other commodities. The reduction in the average rate of the western lines between September, 1921, and September, 1922, was 13 per cent. The western railways in September earned almost $22,000,000 less than they would have if the reductions of rates had not been made. Because of the reduction in rates the earnings of the western lines, on the basis of the traffic of 1921, have been reduced at an annual rate of almost $265,000,000.

"The argument has been made that rates should be reduced because they are too high compared with the prices of commodities, and especially of farm products. A statement just issued by the Bureau of Labor Statistics of the Department of Labor shows that between November, 1921, and November, 1922, the average wholesale price of all commodities increased over 10½ per cent. It also shows that within this year the average increase in the prices of farm products was 18¼ per cent. The result of these reductions in railway rates and increases in the wholesale prices of commodities is that the average rate per ton per mile in the entire country is now only 54 per cent higher than it was in 1913, before the war, while the average wholesale price of all commodities other than farm products and foods is 65 per cent higher.

"Since most of the complaints regarding high railway rates come from the farmers in western territory, it is pertinent to call attention to the fact that as compared with 1913 the average price of farm products is now higher than the average rate of the western railways. The average rate per ton per mile of the western railways in September was only 38.6 per cent higher than in 1913, while the average price of farm products in November was 43 per cent higher than in 1913. The price of corn in the Chicago market is 50 per cent higher than it was a year ago.

"The railways are suffering not only from these large reductions of rates, but also from the increases in prices which have occurred, which include, of course, increases in the prices of the things they have to buy. They are large purchasers of metals and metal products, and the average increase in the price of these things within the last year has been almost 20 per cent. They are the largest purchasers of coal, and they are paying almost 40 per cent more per ton for coal than they were when the coal strike began. They are large purchasers of lumber, and the increase in the price of southern pine within the last year has been 39 per cent, while the increase in the price of Douglas fir lumber has been 36 per cent.

"In the four months following the reductions of rates on July 1, for which complete statistics of earnings and expenses are available, the railways of the country earned almost $87,000,000 less net return than in the same months of 1921, although 1921 was an extremely poor year. In these months the western lines earned $38,000,000 less net return than in the same months of 1921. This reduction of net return was due partly to increases of expenses caused by the shop employees' strike, but mainly to the reduction of rates and increases in the prices of fuel and materials.

"The railways have never been able since the coal strike

ended to furnish the country with as much transportation as it has needed, and the shortage of transportation has been acute in the western states, where the farmers have suffered severely from it. Further reduction of rates, which would be absolutely without justification on economic grounds, would cripple the railways. All signs indicate that the demand for transportation will continue to increase, and the railways will become less and less able to cope with this demand if their rates continue to be the object of unwarranted attacks."

Many Gages Are Found Throughout the World

A Study of the Practices of the Roads of 59 Countries Show 76 Per Cent Use Standard Gage

NOTWITHSTANDING the general tendency throughout the world toward uniformity in railway details, and especially in the promotion of free inter-communication, there is one important detail with respect to which there is still a lack of universal agreement. That detail is the railway gage. The accompanying statistics of railway mileage by gages, compiled by the Bureau of Railway Economics for 59 of the principal countries of the world, show that no one gage or width of track has been adopted to the exclusion of others; the majority of the railways, however, use the so-called "standard" gage of 4 ft. 8½ in. This gage is practically universal in the United States, Canada, Cuba, Holland, Hungary, New South Wales, Turkey and Chosen.

Next to the standard gage comes the meter gage of 3 ft. 3⅜ in. This is the almost exclusive gage in Porto Rico, French Sudan, Malay Peninsula, Bolivia, and Dutch Guiana, applies to a large part of the mileage in Brazil, and is found on some mileage in nearly all the principal countries of Europe and Asia. The two next important gages in use seem to be the 5 ft. 6 in. gage and the 3 ft. 6 in. gage. The former is found chiefly in India, Spain and Argentina. The latter is standard in South Africa, New Zealand, South Australia, Queensland, Tasmania, Western Australia, Japan, and the Philippines.

The accompanying tabulation gives details as to gages on 565,088 miles of railway in the 59 countries. These 565,088 miles represent about 76 per cent of the total railway mileage of the world. Several important, and a number of unimpor-

	North America				Central America						West Indies			
Gage	Canada	Mexico	United States*	Gage	Costa Rica	Guatemala	Nicaragua	Panama	Salvador	Gage	Cuba	Jamaica	Porto Rico	San Domingo
4 ft. 9 in.	....	....	190	5 ft. 0 in.	....	....	....	53	....	4 ft. 8½ in.	2,287	198	13	..
4 ft. 8½ in.	35,694	10,286	241,938	3 ft. 6 in.	322	....	166	....	....	3 ft. 3⅜ in.	....	....	325	..
3 ft. 6 in.	904	....	.....	3 ft. 0 in.	....	962	....	....	100	3 ft. 0 in.	51	....	....	..
3 ft. 3⅜ in.	....	16	.....							2 ft. 6 in.	....	....	....	62
3 ft. 0 in.	....	1,848	1,285	Total	322	962	166	53	100					
2 ft. 6 in.	....	33	.....							Total	2,338	198	338	62
2 ft. 0 in.	....	21	.....											
Total	36,598	12,204	243,413											

SOURCE: Reports of the carriers to the Interstate Commerce Commission and the Universal Directory of Railway officials.

*Miles of Main track owned.

SOUTH AMERICA

Gage	Argentine Republic	Brazil	Chili	British Guiana	Bolivia	Colombia	Dutch Guiana	Ecuador	Paraguay	Peru	Uruguay	Venezuela
5 ft. 6 in.	14,356	.....	64	....	....	....	....	....	....	.....	.....	....
5 ft. 5 in.	....	.....	670	....	....	....	....	....	....	.....	.....	....
5 ft. 4¾ in.	....	.....	11	....	....	....	....	....	....	.....	.....	....
5 ft. 2½ in.	....	1,023	.....	....	....	....	....	....	....	.....	.....	....
4 ft. 8½ in.	1,793	8	431	61	....	....	....	....	158	1,016	1,557	....
4 ft. 3½ in.	....	6	.....	....	....	....	....	....	....	.....	.....	....
4 ft. 2 in.	....	.....	79	....	....	....	....	....	....	.....	.....	....
3 ft. 6 in.	....	.....	275	19	....	11	....	288	....	16	.....	200
3 ft. 3⅜ in.	7,337	18,987	1,497	....	358	345	108	....	....	73	.....	48
3 ft. 0 in.	....	....	.....	....	....	577	....	....	....	306	.....	23
2 ft. 6 in.	....	454	784	....	....	....	....	....	....	.....	.....	....
2 ft. 5-17/32 in.	102	.....	.....	....	....	....	....	....	....	.....	.....	....
2 ft. 0 in.	....	.....	.....	....	....	....	....	....	....	.....	.....	136
1 ft. 11⅝ in.	....	1,152	38	....	....	....	....	....	....	50	.....	....
Total	23,588	21,630	3,840	80	358	933	108	288	158	1,461	1,557	407

EUROPE

Gage	Belgium	France	Greece	Holland	Hungary	Italy	Luxembourg	Norway	Spain	Sweden	Switzerland	United Kingdom
5 ft. 3 in.	....	....	....	....	....	....	...	....	4,777	....	....	3,109
4 ft. 8½ in.	2,972	27,602	780	2,604	11,854	11,518	198	1,297	58	5,863	4,003	20,070
4 ft. 6 in.	....	....	....	....	....	....	...	....	....	....	....	4
4 ft. 0 in.	....	....	....	....	....	....	...	....	....	....	....	7
3 ft. 8 in.	....	....	....	....	....	....	...	....	14	....	....	....
3 ft. 7 in.	....	....	....	....	....	....	...	....	....	51	....	....
3 ft. 6 in.	306	....	....	....	339	....	...	652	....	329	....	26
3 ft. 3⅜ in.	2,128	4,308	639	....	30	214	312	16	3,644	....	608	....
3 ft. 1 9/16 in.	....	....	....	....	....	1,137	...	....	....	....	....	....
3 ft. 0 in.	....	....	....	....	....	....	...	....	....	....	....	395
2 ft 11 in.	....	....	....	....	....	....	...	....	....	1,540	....	....
2 ft. 8½ in.	....	....	....	....	....	....	...	....	....	....	....	2
2 ft. 7 31/32 in.	....	....	....	....	....	....	...	....	....	....	35	....
2 ft. 7½ in.	....	....	....	....	....	....	...	....	....	32	....	5
2 ft. 6 in.	....	....	....	....	....	....	...	....	....	....	....	12
2 ft. 5 17/32 in.	....	....	....	....	9	....	...	52	65	....	9	....
2 ft. 4½ in.	....	....	....	....	....	....	...	....	....	....	....	9
2 ft. 4 in.	....	....	....	....	....	....	...	....	....	....	....	3
2 ft. 3 9/16 in.	....	....	....	....	....	....	165	....	....	....	....	....
2 ft. 3 in.	....	....	....	....	....	....	...	....	....	....	....	24
1 ft. 11⅝ in.	....	....	....	....	....	....	...	....	....	83	....	....
1 ft. 11½ in.	....	140	....	....	....	....	...	....	....	....	....	51
1 ft. 3 in.	....	....	....	....	....	....	...	....	....	....	....	7
Total	5,406	32,050	1,419	2,604	12,232	12,869	675	2,017	8,558	7,898	4,655	23,724

AFRICA

Gage	British East Africa	Egypt	French Sudan	Gold Coast	Nigeria	Union of South Africa	West Africa (Angola)
4 ft. 8½ in....	...	1,849	....	....	....	....	....
3 ft. 6 in.....	...	1,070	....	269	983	8,982	390
3 ft. 3⅜ in....	94	....	1,186	....	....	....	226
2 ft. 7 31/32 in.	...	....	....	....	....	560	....
2 ft. 6 in.....	108	....	....	....	143	....	....
2 ft. 5 17/32 in.	...	915	....	....	....	....	....
Total.....	202	3,834	1,186	269	1,126	9,542	616

AUSTRALIA

Gage	New South Wales	New Zealand	South Australia	Tasmania	Victoria	Western Australia	Queensland
5 ft. 3 in....	...	....	1,124	....	4,092	....	....
4 ft. 8½ in..	5,048	....	....	....	....	....	....
3 ft. 6 in....	36	3,010	1,210	818	....	4,003	5,931
3 ft. 3⅜ in..	18	....	....	....	....	....	....
2 ft. 6 in....	...	....	....	....	122	....	....
2 ft. 0 in....	...	....	....	41	....	....	....
Total....	5,102	3,010	2,334	859	4,214	4,003	5,931

ASIA

Gage	China	Chosen	India	Japan	Malay Peninsula	Mesopotamia	Philippine Islands	Siam	Turkey
5 ft. 6 in....	....	....	21,126	....	....	...	...	....	...
5 ft. 0 in....	3,746	....	....	....	....	...	...	....	...
4 ft. 9 in....	344	....	....	....	....	...	...	....	...
4 ft. 8½ in..	2,242	1,157	....	24	....	186	...	590	814
3 ft. 6 in....	....	....	....	7,248	....	...	925	....	...
3 ft. 3⅜ in..	151	....	13,914	....	1,209	624	...	836	...
2 ft. 6 in....	....	....	1,629	151	....	58	...	....	...
2 ft. 0 in....	....	....	582	26	....	...	...	....	...
Total.....	6,483	1,157	37,251	7,449	1,209	868	925	1,426	814

tant, countries are not included because complete or up-to-date statistics are not easily available. Among the countries so excluded are Russia (including Siberia), Germany, Poland, Turkey in Europe, Bulgaria, the Balkans, and various possessions in Africa and elsewhere.

Of the 565,088 miles operated in the 59 countries, here covered, in 1920, 396,169 miles are of the standard gage, 54,685 miles are of a gage wider than standard, and 114,234 miles of a narrower gage, the percentages being as follows:

Standard gage,	70	per cent
Wide "	10	per cent
Narrow "	20	per cent

The three gages shown for the United States are for the Class I railways, and represent 243,413 miles of main track owned. Practically all of this mileage is 4 ft. 8½ in. gage. During recent years there has been a rapid concentration on the standard gage in the United States and at the present time only three gages are in use on Class I railways. Of these the standard gage represents 99.4 per cent of the total mileage, the remaining 0.6 per cent being divided between 4 ft. 9 in. and 3 ft.

The railway mileage of Canada is divided between two gages. Ninety-eight per cent represents standard gage, while the other two per cent is 3 ft. 6 in. gage.

The United Kingdom has 3,109 miles of the broad gage of 5 ft. 3 in. (1.676 meter), and it also boasts of the narrowest, that of 1 ft. 3 in. However, 85 per cent of the railway mileage of that country is standard gage.

On the continent of Europe the English standards and details were adopted in the first lines to be constructed, and at the present time the standard gage, whose metric equivalent is 1.435 meters, represents 76 per cent of the railway mileage operated. But as in the United Kingdom this gage is not universal. For the 11 continental European countries shown in the accompanying statement no less than 23 gages are represented. Nearly all European countries (Spain excepted) have adopted the standard gage for their main lines, while secondary or local lines have been constructed on narrow gages.

In Africa the gages are mainly 3 ft. 6 in., 3 ft. 3⅜ in. (meter) and 2 ft. 5 17/32 in. (0.75 m.). The railways there also operate 1,849 miles of standard gage.

The mileage of the railways of Australia, including Tasmania, consist of six gages. The 3 ft. 6 in. gage predominates with standard gage next in importance, while there is a small amount of mileage of 2 ft. 6 in., and 2 ft. gages still in service. A commission recently appointed to consider the unification of railway gages in Australia has recommended that the 4 ft. 8½ in. gage be adopted as standard.

In Asia, the Indian railways, the largest Asiatic system, are divided chiefly between a "broad" gage of 5 ft. 6 in. and a narrow gage of 2 ft. The greater percentage of the Chinese railway mileage is 5 ft., although 35 per cent of the mileage of that country is of standard gage. Practically all the Japanese lines use the gage of 3 ft. 6 in. (1.067 m.).

In South America there is great diversity, lines being built to gages ranging from 1 ft. 11⅝ in. (0.60 m.) to 5 ft. 6 in. In Central America and the West Indies the principal gages are 4 ft. 8½ in., 3 ft. 6 in., and 3 ft., with 4 ft. 8½ in. predominating except in Panama, where the gage is 5 ft.

Interstate Commerce Commission May Require Additional Equipment

WASHINGTON, D. C.

THE Interstate Commerce Commission announced on December 27 what promises to be one of the most important general investigations it has ever undertaken, under docket 14,489, "into and concerning the adequacy of the locomotives and cars of all descriptions owned and of the locomotives and cars used by each such common carrier by railroad, and used in the transportation of freight between points in continental United States, and into and concerning the customs and practices prevailing or desirable with respect to the ownership, use and interchange of cars with a view to promoting economical and efficient service, to prescribing and establishing such just and reasonable rules, regulations and practices with respect to car service, and to require the respondents to provide themselves with such safe and adequate locomotives and cars wherewith to perform as common carriers their car service as may upon such investigation appear to be contemplated and required by law." The order was entered on December 11. As a preliminary step the commission has by questionnaires attached to the order called upon the carriers for the following information:

(a) Freight train cars owned or leased at the beginning and close of year 1922, and number ordered but not delivered December 31, 1922.

(b) Estimated number of additional cars needed by classes; estimated cost thereof; proposed program for acquiring such cars; and proposed plan of financing.

(c) Ages of cars in service by classes, December 31, 1922, 100,000 lb. capacity and over.

(d) Ages of cars in service, 80,000 lb. and less than 100,000 lb. capacity.

(e) Ages of cars in service, 60,000 lb. and less than 80,000 lb. capacity.

(f) Ages of cars in service less than 60,000 lb. capacity.

(g) Locomotives owned or leased at the beginning and close of year 1922 and number ordered but not delivered on December 31, 1922.

(h) Unserviceable locomotives on line first of each month in 1922, by classes, and tractive power.

(i) Ages of locomotives at close of year 1922, by classes —freight, passenger, switch.

(j) Estimated number of additional locomotives needed;

proposed program for acquiring such equipment; and proposed plan of financing the purchase thereof.

(k) Commodities loaded monthly, 1922, revenue freight—carloads.

(l) Carloads of non-revenue freight loaded monthly, 1922.

(m) Freight cars on line daily, serviceable and unserviceable, by months in 1922—box, coal.

(n) Freight cars on line daily, serviceable and unserviceable, by months in 1922—refrigerator, flat.

(o) Freight cars on line daily, serviceable and unserviceable, by months in 1922—stock, all freight.

(p) Freight car surplusages, daily averages by months, 1922, railroad owned cars.

(q) Freight car shortages, daily averages by months, 1922, railroad owned cars.

(r) Freight car surplusages, daily average by months, 1922, cars owned by private companies.

A questionnaire has also been directed to all private car lines requesting information concerning freight train cars owned or leased by them, and the number of such cars ordered but not received.

All carriers by railroad subject to the Interstate Commerce Act are made respondents. The governor of each state, as well as the tribunal thereof, if any, having regulatory powers over the common carriers by railroad, have been notified of this proceeding.

The times and places for hearings will be announced later.

The Transportation Act gave the commission for the first time authority to require railroads to provide an adequate supply of equipment and the numerous complaints it has received because of the unprecedented car shortage of this fall have apparently decided the commission to see whether the remedy lies in the exercise of such powers. Such an investigation will naturally involve such additional questions as whether the need is for additional cars or a better supply of motive power or more adequate terminals which will enable obtaining greater service from the existing equipment; whether shippers should provide themselves with greater storage facilities or whether the business of the country can be better distributed through the year so that there will not be so acute a demand for cars for seasonal loading, and also, if it should be determined that more railroad equipment is required, what companies should be the ones to purchase it. When the Railroad Administration ordered a considerable number of cars and locomotives it allocated them to the companies best able to finance them rather than to those that needed them the most.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR loading during the week ended on December 16 continued to break all records for the season of the year. The total was 888,082, an increase of 162,008 over the corresponding week of 1921, and of 85,811 over 1920. The usual seasonal decline was shown, however, by a drop of 31,000 as compared with the previous week. In all districts except the Pocahontas, where the loading was less than in 1920, the figures exceeded those of both 1921 and 1920 and the same was true of all classes of commodities except coal and ore. Coal loading was 198,510 cars as compared with 134,789 in 1921 and 225,059 in 1920. Miscellaneous loading was 45,000 cars above that for 1920 and there was an increase of 14,000 cars in grain, 8,000 in live stock, 13,000 in forest products and 31,000 in merchandise.

REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, DECEMBER 16, 1922

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded: This year 1922	Corresponding year 1921	Corresponding year 1920
Eastern	1922	10,003	4,185	60,137	2,618	5,971	2,735	62,804	79,094	227,547	.....	.....
	1921	9,566	4,030	38,928	1,777	4,925	808	60,759	59,712	.....	180,505	192,482
Allegheny	1922	3,413	3,559	56,084	6,586	3,525	2,699	45,691	70,760	192,317	.....	.....
	1921	3,018	3,400	41,290	3,606	2,573	2,378	45,731	47,177	.....	149,173	177,122
Pocahontas	1922	253	126	18,214	577	1,544	142	6,008	3,295	30,159	.....	.....
	1921	247	92	14,675	159	1,304	24	5,487	3,085	.....	25,073	31,815
Southern	1922	3,290	2,251	23,004	1,337	22,284	1,113	37,848	40,863	131,990	.....	.....
	1921	4,023	2,116	15,420	481	18,003	594	37,911	34,062	.....	112,610	124,964
Northwestern	1922	15,640	11,011	11,742	1,637	11,932	909	25,400	29,303	107,574	.....	.....
	1921	13,747	9,681	6,181	825	9,844	308	25,670	23,630	.....	89,886	91,761
Central Western	1922	13,462	14,769	23,650	375	6,615	2,568	31,105	40,798	133,342	.....	.....
	1921	12,628	11,805	14,928	193	4,874	758	30,683	34,470	.....	110,339	119,280
Southwestern	1922	4,943	3,247	5,679	96	8,231	582	15,604	26,771	65,153	.....	.....
	1921	4,365	2,794	3,367	124	6,455	635	16,222	24,526	.....	58,488	64,847
Total Western districts	1922	34,045	29,027	41,071	2,108	26,778	4,059	72,109	96,872	306,069	.....	.....
	1921	30,740	24,280	24,476	1,142	21,173	1,701	72,575	82,626	.....	258,713	275,888
Total, all roads	1922	51,004	39,148	198,510	13,226	60,102	10,748	224,460	290,884	888,082	.....	.....
	1921	47,594	33,918	134,789	7,165	47,978	5,505	222,463	226,662	.....	726,074	.....
	1920	35,231	30,472	225,059	12,340	46,748	14,489	192,721	245,211	.....	.....	802,271
Increase compared	1921	3,410	5,230	63,721	6,061	12,124	5,243	1,997	64,222	162,008	.....	.....
Decrease compared	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1920	15,773	8,676	.....	886	13,354	.....	31,739	45,673	85,811	.....	.....
Decrease compared	1920	.....	.....	26,549	.....	.....	3,741	.....	.....	.....	.....	.....
December 16	1922	51,004	39,148	198,510	13,226	60,102	10,748	224,460	290,884	888,082	726,074	802,271
December 9	1922	55,608	38,170	200,505	13,051	63,195	9,879	228,392	311,028	919,828	741,341	837,953
December 2	1922	49,341	34,381	186,158	13,075	60,010	10,550	199,717	291,987	845,219	741,849	882,604
November 25	1922	54,790	40,217	202,032	13,234	66,046	15,052	228,771	335,353	955,495	673,465	803,701
November 18	1922	55,204	40,735	205,024	12,431	61,403	32,780	228,922	352,595	969,094	790,363	889,138

Compiled by the Car Service Division, American Railway Association.

THE KANSAS INDUSTRIAL COURT has ordered the arrest of 46 railroad strikers at Horton, Kan., charging violations of the Industrial Court Act. The warrants were issued on the three counts of disturbing the peace, picketing and conspiracy to obstruct the operation of the railroads.

The Rich Lerma Valley, Served by the New Line

New Transcontinental Line in Northern Argentina

Interesting Engineering Problems Involved—Rich Agricultural and Oil Lands Made Accessible

By Richard F. Maury
Chief Engineer, Salta to Antofagasta International Railway

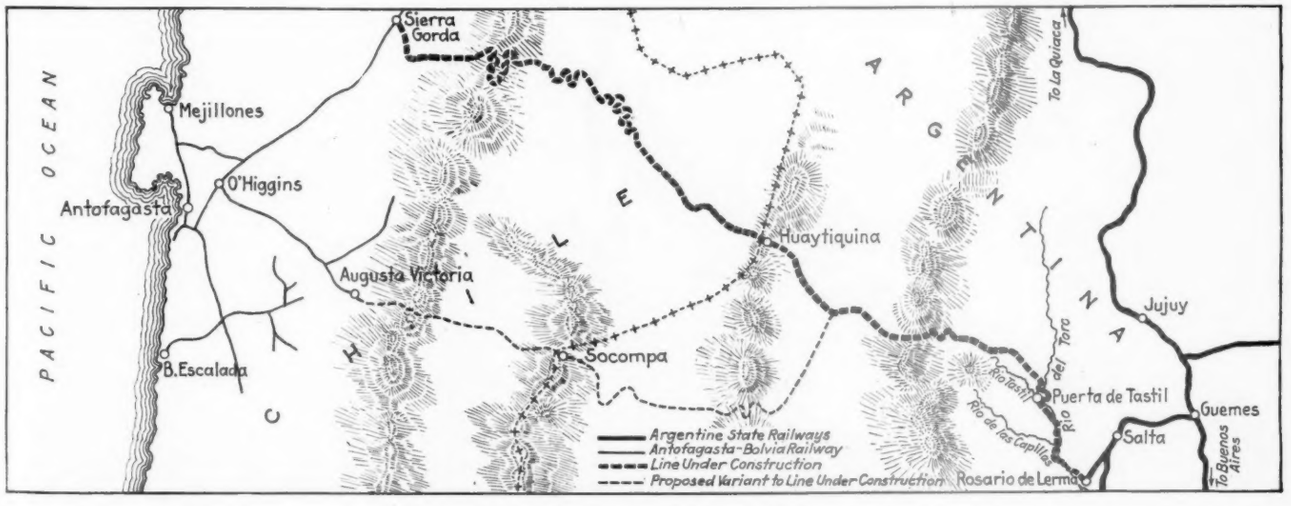
WITH THE OBJECT of opening up the rich northern provinces of Argentina it was recently decided by the governments interested to initiate the construction of a new trans-Andean line from the city of Salta, Argentina, to the port of Antofagasta, Chile, on the Pacific, crossing the main range of the Andes and following roughly the traditional Inca highway through the mountains. This line at its eastern terminus connects with the Argentine State Railway system, of which it will form an integral part. From many points of view it presents features of great interest, prominent among which are the low rates of grade, as gradients go in the country, which have been found feasible and some rather remarkable developments which have been introduced to maintain these low gradients.

The Argentine provinces which will be served by the line are at present sparsely settled, due to the want of a port and the enormous distances that separate them from the littoral, the center of the sugar district, which is in this territory, being more than a thousand miles from Buenos Aires. The fertile plains and wonderful valleys of the region make of it one of the most promising zones in the world for future development, producing as it does every class of tropical and sub-tropical products, timber, cattle and minerals.

New Line to Reduce Distance

The new line now in construction will reduce the rail haul to the sea by 435 miles, more or less, while the sea haul to American ports will be enormously reduced, the distance from Antofagasta to Panama being only 2,200 miles. Undoubtedly the present trade routes will be completely changed by this construction and it will be a factor of great importance in encouraging commercial relations between the United States and Argentina.

Taking as a center, Guemes, the junction point of the new

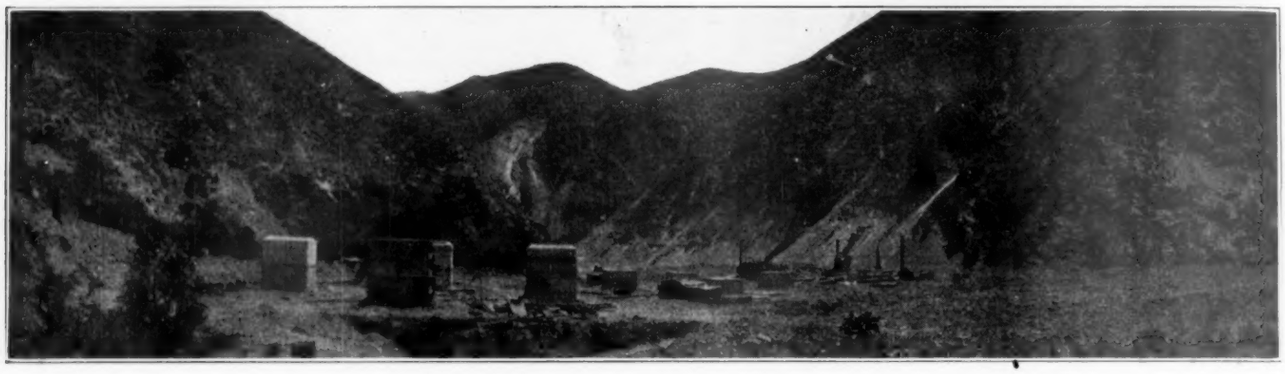


The New Transcontinental Link

line with the State Railways, the distances to the sea and American and European ports are as follows:

From	To Antofagasta Miles	To Buenos Aires Miles
Guemes	469	931
Liverpool	6,770	6,258
New York	4,212	5,838
New Orleans	3,620	6,255
Amsterdam	7,058	6,370

Northern Argentina and eastern Bolivia will, in time, be large consumers of American products. The sugar industry, already well established, will acquire impetus with the opening up of the new route, while the existence of enormous fields of petroleum in the region has aroused the interest of American capital, boring operations on a large scale having been started. This also will be a source of traffic, while it is probable that, in time, a considerable proportion of the agricultural machinery used in the Argentina will be imported through this new channel. Trade relations will not, in any sense, be unilateral since northern Argentina can become in time one of the great corn and cattle producing areas of the world. With these facts in view, the new line is being constructed to handle a heavy traffic.



Viaduct, 950 ft. in Length and 80 ft. High, Being Built Over the Rio Toro

Maximum Grades 2.5 Per Cent

Work on the Argentine section of the line was begun with great activity in April, 1921. The original surveys included several sections of rack rail with gradients up to 7.5 per cent and normal grades of 3 per cent, but it was wisely determined to try for a 2.5 per cent line, compensated, and with relatively easy curvature (11 deg. 40 min.). New surveys now being undertaken on this basis have reached the stage where it is possible to state that these standards will not be passed at any point. The work is being done by the State Railway organization of which Domingo Fernandez Beschtedt is general manager and Arthur Acevedo chief engineer. Surveys and construction work are in charge of the writer.

The line leaving Salta crosses the rich Lerma valley for some 25 miles to intern itself in the gorge of the Rio Toro, which it follows to Puerta de Tastil, 65 miles. In the first 19 miles of the gorge of the Toro, the rise of the river bed is, in parts, in excess of the maximum grade and due to the impossibility of introducing development without recourse to rising tunnels, it was found necessary to employ two short sections of switch-back, one of 3,937 ft. and one of 2,625 ft., both placed at crossing stations to reduce operating difficulties to a minimum.

A Sharp Climb

At Puerta de Tastil the line leaves the Toro to swing west directly toward the coast and here the principal difficulty was encountered. A table land running in the direction desired on practically maximum grade was found, but between its level and the bed of the Toro there exists a vertical rise of some 2,300 ft. in an air line distance of 5 miles. Careful surveys of the region, of which a part was made by photo-stereoscopic methods employing the Zeiss photo comparator, demonstrated the possibility of attaining sufficient development within the established grade, and at one point the line makes six spirals around a group of conical hills on practically a surface line. From a scenic point of view this is without doubt one of the most remarkable stretches of rail in the world. At the top of the climb the traveler will dominate with his eye on a range of snow-covered hills, many of which exceed 20,000 ft. in altitude, while below him the line stretches away in eight distinct levels, the last being more than 2,000 ft. below.

Erecting 2-10-2 Locomotives, Built by Baldwin

The line from here follows to the west with very easy grading, with the exception of the crossing of the three dis-

tinct ranges in the Abra Blanca (13,450 ft. high), the Abra Chorillos (14,750 ft.) and the continental divide at the frontier, the point of which crossing is not yet decided.

Danger from Slides

In the period from April to December, 1921, 56 miles of very heavy grading have been finished, with a total of more than 2,000,000 cubic yards of rock and hard-pan, while 25,000 cubic yards of bridge and culvert masonry have been finished in the same time. Some heavy viaduct and tunnel work is found on the same section, as well as hillside retaining walls. The lower stretches of the line are in a zone of torrential rainfall and slides will be the worst enemy of the constructor. In places, to avoid future difficulties, the line is carried under the mud slides in cut-and-cover tunnels carried out in reinforced concrete and it is possible that in the future considerably more work of this nature will be required. Fortunately, in the higher altitudes the precipitation is very small and no difficulty will be experienced with snow, giving the new line a great advantage over the existing Transandine line in the province of Mendoza.

The work is being given out on small contracts, the railway furnishing equipment, and 5,000 men are being employed, mostly Argentine peons from the mountain districts, who are proving extremely good workers. The equipment includes 70-ton railway type, Bucyrus shovels, complete compressed air equipment for the tunnel work and a large fleet of motor trucks. Well-equipped shops are being provided for the erection and repair of locomotives and plant, while, to better the living conditions of the workers, co-operative stores have been established in which it is possible to purchase articles of good quality at cost price.

The line is of meter (39.37 in.) gage to conform to the gage of its connections and is being laid with 80 lb. rails on red quebrachi ties (2,420 per mile) and is heavily ballasted with broken stone and gravel. Santa Fe type locomotives of 146 tons are being supplied by the Baldwin Locomotive Works, the first having been erected and placed in service. The fuel used is crude oil from the Argentine fields and complete installations for storage and loading are being erected in Salta.

An Alternative Route

Work on the Chilean section has not been started, pending the decision of a variant of the original survey through Huaytiquina. The modification proposed, the possibilities of which in Argentine territory are now being studied, will pass the frontier in Socompa, considerably to the South of Huaytiquina, skirting the volcano of Socompa to connect up at Augusta Victoria (the ex-kaiser's important nitrate mine) with an existing branch of the Antofagasta & Bolivia Railway. This line of 75 centimeter (2 ft. 5½ in.) gage would be rebuilt to meter gage and put into condition to handle the heavy traffic of the transcontinental line. The proposed variant would be very advantageous to Argentina, since it would reduce considerably the total distance between Salta and the sea, while increasing the part to be constructed by the Argentina by only some 50 miles. Considerable opposition to this cut-off has been aroused in the north of Chile, since it avoids the richer mining regions and the only zone with irrigation.

Rio Toro Gorge—Railroad Embankment on One Side, Highway on the Other

Accident Investigations—July, August and September*

THE THIRTEENTH quarterly issue of the Summary of Train Accident Investigations, prepared by the Bureau of Safety of the Interstate Commerce Commission, which is for the months of July, August and September, 1922, was issued on December 20. The report covers 21 collisions and 11 derailments, besides an accident on an electric road and one on the New York & Long Branch which was not a train accident.

Below is a list of these accidents, the date in the last column being that on which a report of the accident was published in the *Railway Age*. The letter *c* indicates collision and *d*, derailment. Ten of these I. C. C. reports have already been noticed in these columns, as noted; ten others, indicated by stars in the list, are abstracted below; leaving 14, of relatively less importance, which must be omitted because of limitations of space.

Abstracts of Government Reports

Atchison, Topeka & Santa Fe, Burrton, Kan., July 8, about 4 p. m. Eastbound passenger No. 4, consisting of locomotive 1428, a buffet car, a dining car and five sleeping cars, while moving at 18 or 20 miles an hour, ran over a misplaced switch and into some cars of gasoline standing on a side track; one passenger killed and 48 passengers and employees injured. The buffet car was telescoped for half its length by the dining car. Tank cars on the siding were ignited and burned; but the cars in the passenger train were not damaged by fire. The line of road is straight, the switch target showed red and the weather was clear, but the engineman evidently did not see the target; and the fireman did not see it until he was very close to it. The switch is close to the station and close to the crossing of the St.

*Previous quarterly summaries, for 1921 and 1922, were noticed in the *Railway Age*, as below:

No. 7, 1921, July 2, 1921, page 35;
No. 8, 1921, September 3, 1921, page 459;
No. 9, 1921, December 10, 1921, page 1145;
No. 10, 1921, June 10, 1922, page 1343;
No. 11, 1922, June 17, 1922, page 1483;
No. 12, 1922, September 2, 1922, page 426.

Louis-San Francisco. The operator at the station had just returned to its normal position the gate at the St. L.-S. F. crossing, but had not noticed the switch in the wrong position. The report, quoting the fireman, says that the tank at the station is painted red and forms a background for the target, making it difficult to read the indication for any considerable distance. The inspector finds that the switch had been left in the wrong position by the conductor of a freight train of the St. Louis-San Francisco, who had been using the Santa Fe track a few minutes before for the purpose of turning his locomotive; but the conductor claimed emphatically that he went back to the switch and closed it. The speed of trains over the St. Louis-San Francisco crossing is limited by rule to 15 miles an hour; and it is held that if the engineman had obeyed this rule, the collision probably would have been avoided. It seems to have been the common practice for the Frisco people to use the main track of the Santa Fe at Burrton for turning

ACCIDENT INVESTIGATIONS COMPLETED IN THIRD QUARTER OF 1922

d.	Atlanta, B. & A.	Ben Hill, Ga.	March 12.	
d.	Atlantic City	Winslow J.	July 2	Sept. 23.
..	N. Y. & Long Br.	Asbury Pk.	July 4.	
c.	A., T. & Santa Fe.	*Burrton, Kan.	July 8.	
c.	Mo. Pacific	Leeds, Mo.	July 12	Sept. 9.
c.	M., K. & Texas.	Alsuma, Ok.	July 19	Sept. 9.
c.	St. Louis-S. F.	Logan, Mo.	July 22	Sept. 9.
c.	Penn.	Lester, O.	Aug. 1	Sept. 9.
..	Cincinnati, L. & N.	Pleasant Ridge—same as preceding.		
c.	M., St. Paul & S. S. M.	*Gile, Wis.	Aug. 3.	
c.	Mo. Pacific	Sulphur Spgs.	Aug. 5	Aug. 19. Nov. 18.
c.	Balt. & Ohio	Ellwood Cy.	Aug. 6	Sept. 9.
d.	Boston & Alb.	Worcester	Aug. 8.	
d.	Bangor & A.	Caribou	Aug. 9.	
c.	M., St. Paul & S. S. M.	Annadale	Aug. 12	Aug. 19. Aug. 26.
c.	Balt. & Ohio	Kanawha	Aug. 13.	
c.	Nor. Pacific	*Durant	Aug. 14.	
c.	St. Louis-S. F.	*Horine	Aug. 16.	
..	Internt'l	Elwood, N. Y.	Aug. 17.	
d.	Mich. Central	Gary, Ind.	Aug. 20.	
d.	Ches. & Ohio	Muncie	Aug. 21.	
c.	Ill. Central	*D. Boone	Aug. 24.	
d.	Nor. Pacific	Wymer	Aug. 25.	
c.	Colo. & South'n.	Marnel	Aug. 27.	
c.	Utah	*Martin	Aug. 28.	
d.	Chi. & N. W.	Waukesha	Aug. 30.	
d.	St. Louis-S. F.	*Starland	Sept. 1.	
c.	Nor. Pacific	*Parkwater	Sept. 7.	
d.	Macon, D. & S.	Fitzpatrick	Sept. 11.	
c.	S. P. and I.-G. N.	Houston	Sept. 13	Nov. 11.
c.	Chi. & N. W.	*Clintonville	Sept. 17.	
d.	Mobile & O.	Tamala	Sept. 18.	
c.	Southern Pac.	*Montalvo	Sept. 22.	
c.	Denver & R. G. W.	Toltec, N. M.	Sept. 29	Oct. 28.
c.	Ill. Central	Doris	Sept. 30.	

locomotives, without any form of protection, except that inquiry would be made of the operator if the block was clear, the line of the Santa Fe being worked by a manual block system.

Minneapolis, St. Paul & Sault Ste. Marie near Gile, Wis., August 3. Eastbound extra freight 2427 collided with westbound freight No. 151. Both locomotives were badly damaged and the fireman of train 151 was killed. Nine other employees were injured. The operator at Ironwood had neglected to deliver a meeting order to train 151. It appears that he accepted the order from the dispatcher after the train had left his station; he evidently had depended upon the conductor to come into the office, as was his ordinary practice, after finishing his switching and before departing. The operator had been in service five years and had a clear record.

Northern Pacific, Durant, Mont., August 14. Westbound freight extra No. 1747, moving at about 18 miles an hour, collided with eastbound passenger No. 2, moving at about 10 miles an hour. Both of these trains were long and heavy, but the report says that neither of the locomotives was derailed. The second car in the passenger train was telescoped by the first for about 15 ft. The express messenger on the passenger train was killed and 20 passengers and 4 employees were injured. No block signal system is in use on this line. The freight had no orders and no rights against No. 2 and every man on the train admitted overlooking No. 2, although all had time-tables and all were familiar with the road and with the regular trains of the division. The conductor said that he had consulted his time-table on leaving Butte, 13 miles east of the point of collision; but. he did not make a thorough check of it for opposing trains as he had worked on this line for years and was positive that he absolutely knew which trains were due. None of the men gave any reason for their neglect.

St. Louis-San Francisco, Horine, Mo., August 16. Southbound passenger train No. 801 collided with northbound passenger No. 806, causing fatal injury of Engineman Weston of the southbound train and Fireman Jones of the northbound. Five employees and 68 passengers were injured. Train 806 was standing on the main track waiting for the southbound, which was ordered to enter the siding, but did not do so. Engineman Weston appears to have been under the impression that the northbound train, which was late, had passed on to the double track at Southeastern Junction, 28 miles north of Horine. Weston had received an order fixing Horine as the meeting point, but he had made a remark to the fireman from which it is believed that he had misunderstood the order and had taken it as a notice that No. 806 had cleared the single track line. Weston had had considerable trouble with his injector and other things on the locomotive; this could have no direct bearing on the misinterpretation of the order, but it may have prevented him from seeing No. 806 in time to avert the collision. The fireman, who had been in the service 12 years, was a son of the engineman. The meeting order had not been shown to him. Had he insisted on a compliance with the rule and thus had read the order himself instead of taking the engineman's interpretation of it, "it is probable that the error or oversight on the part of the engineman would have been discovered in season." The engineman had been a runner 20 years. He had been dismissed once and had been disciplined for serious infractions of the rules, including two occasions when he was responsible for collisions; but at the time of this collision, "his record was clear." No block signal system is in use on this line.

Illinois Central, Daniel Boone, Ky., August 24. Collision between southbound third-class freight train No. 197 and northbound second-class freight No. 176; three trainmen and one trespasser killed and five employees and one other person were injured. This is a single track line with no block signal system in use. The northbound train had been ordered to wait at St. Charles, about two miles south of Daniel Boone, until 5:15 P. M., but it did not do so; also, the southbound train left Daniel Boone and attempted to reach St. Charles without sufficient time to clear the other train five minutes, as required by the rule. The inspector reports that there was "an utter disregard for the rules, as far as time was concerned, by all the employees involved." The operator at St. Charles recorded the departure of 176 before the train started; No. 197 disregarded the rule requiring it to keep 10 minutes behind a preceding passenger train. The operator at another station mis-stated the time of this train so as to make it appear that the 10-minute interval had been observed; and from the nature and multiplicity of these violations of rules, the inspector concludes that they are of common occurrence. The circumstances attending this collision "present an extreme case of lax operating conditions." The fireman of train 176 was inexperienced and the conductor of 197 had been promoted only five days before.

Utah Railway, Martin, Utah, August 28. Westbound extra freight No. 102 collided with eastbound extra freight No. 3 in a tunnel, 240 ft. from the end, both trains moving at low speed; one employee killed and four injured. The westbound train had an order to wait at Jacobs, east of the tunnel, until 2:35 p. m. Afterward, the dispatcher issued another order allowing the eastbound extra until 3:15 to

reach Jacobs. The westbound train, being on a descending grade, was moving at more than eight miles an hour while the speed limit in the tunnel is six miles an hour; also the line in the tunnel is on a curve of eight degrees, and one of the locomotives had no headlight because the engineman had forgotten to replace a defective bulb. The eastbound train was pulled out of the tunnel, after the collision, without delay, but the other one took fire and six cars were destroyed, together with some of the timber lining of the tunnel.

The dispatcher was performing the duties of local freight agent and was hurried; and in allowing Extra No. 3 until 3:15 P. M. to reach Jacobs, he was acting on a mistaken reading of the preceding order in his book. He discovered his mistake in less than two minutes after the faulty order had been delivered, but too late to prevent the collision.

The inspector found much loose practice. An operator signed a conductor's name to an order and allowed the conductor to sign his (the operator's) name, to a clearance card. Orders were often issued for train movements without regard to the rule requiring them to be given to all concerned in the same words; that is to say, the use of the single-order system was habitual.

Orders restricting rights of trains are sometimes issued without sending copies to the superior train. Trainmaster Thompson, about a month before, had been assigned to this district, with instructions to watch the work of the dispatchers; but being very busy in distributing cars to mines, he had not made any useful investigation of dispatching practices. Personally, he considered the single order system unsafe, but had not got around to making a change.

The inspector characterizes Thompson's attitude as amazing. He had checked the train dispatcher's order book three times but had not discovered the glaring faults to be found in it. No block system was in use, yet conductors and enginemen neglected to compare watches with each other and one engineman did not know where the standard clock was located. The train dispatcher entered the service of the Utah Railway as operator in June, 1920, and was made dispatcher a year later.

St. Louis-San Francisco, Starland, Mo., September 1. Southbound passenger train No. 805, moving at about 40 miles an hour, was derailed on a trestle bridge which had been weakened by a flood, resulting in the death of three passengers and the injury of 64 passengers and four employees. This derailment occurred about 4 a. m., and the two central bents of the bridge, which extended 11 ft. 6 in. into the earth, had been entirely washed out by a flood which occurred between midnight and 3 a. m. The section foreman had gone to bed at 1:30 a. m., concluding, from what he deemed satisfactory evidence, that the rain had not been sufficiently serious to endanger the track. Trestles have been maintained at this point for 19 years and this is the first trouble that has been experienced with wash-outs.

Northern Pacific, Parkwater, Wash., September 7. Westbound passenger train No. 41, moving at about 40 miles an hour, or faster, ran into a preceding train of one locomotive and three coaches carrying shop workmen, and moving slowly, near the station; and six employees were killed and four injured. The employees killed were the engineman and the electrician of the passenger train, the engineman and the fireman of the shop train and two shop employees. The collision occurred at 7:12 p. m. Parkwater is 4½ miles east of Spokane. The shop train had brought a load of shopmen from Spokane and discharged most of them at the shops at Parkwater, and had just crossed over to the westbound track preparatory to returning to Spokane. At this point the two main tracks are 132 ft. apart and the crossover, through which the shop train passed from one to the other, is 1,280 ft. long. The road is equipped with automatic block signals and there is a switch indicator at each of the two switches of the crossover; but except at the ends, the crossover track is not bonded; and a short train, moving from one track to the other, does not hold the main line signals against approaching trains throughout the whole of its journey through the crossover.

Between Parkwater and Spokane, the speed of all passenger trains is restricted to 20 miles an hour, the whole territory being included within yard limits. The block signal which should indicate stop for westbound trains as soon as the crossover switch is opened, is 6,228 ft. east of the point of collision; and the next signal, which at the same time should indicate caution, is more than two miles farther east.

The route of the shop train being wholly within yard limits, the train is regularly moved without written orders. By rule, the shop train must protect against regular passenger trains, but the only precaution taken when passenger trains are late is for the conductor to examine a blackboard on which is kept a memorandum of telegraphic advices received indicating when trains are expected to arrive. Approaching Parkwater from the east, the line of road is straight, and parallel to it is a highway on which many automobiles travel; and employees said that often it was impossible to tell, when seeing an approaching headlight, whether it was on a train or on an automobile. In the present case, the men of the shop train saw a headlight approaching and concluded it was a freight train. No flag was out, and all efforts to move the shop train out of danger or to stop the passenger train, were too late. There is a rule requiring that when making a crossover movement at least one of the switches must be kept open; but the trainmen did not know of or did not realize its importance. Train 41 had been reported late and was not expected at Spokane until 7:35.

The engine of the passenger train was overturned, as was one of its cars and the engine of the shop train, which was at the east end, pushing the cars, was wrecked, together with the car next ahead of it.

The report gives the primary cause as the occupying of the main track within yard limits without authority or proper flag protection; and the secondary cause, the failure to keep one of the crossover switches open all the time the crossover was being occupied. The inspector thinks that train 41 received a clear home signal because the shop train at that moment was on the unbonded section of the crossover, No. 41 having passed the distant signal at clear before the shop train entered the crossover. Hand signals were given to stop the shop train after the impending danger was discovered, and it is impossible to explain why these were not heeded by the engineman.

The inspector says that proper vigilance on the part of the officers of the road would have disclosed that the information posted on the blackboard was being improperly used to dispense with flag protection and that the switches at the crossover were not being operated according to the rules. The cars of the shop train were being pushed ahead of the engine, yet the conductor, on the front of the leading car, had no means of applying the air brakes, except by going inside of the car.

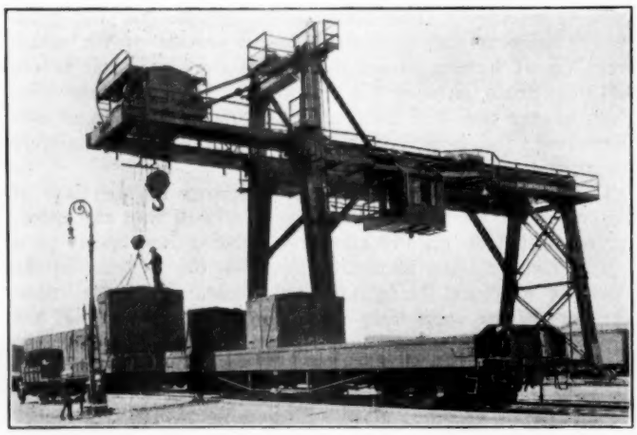
Chicago & Northwestern, Clintonville, Wis., September 17. Westbound passenger train No. 141 collided with eastbound freight extra 1875 which, while most of its cars were on a side track, was switching on the main track, on the time of the passenger train. Its locomotive fouled the main track at the east switch of the passing track at the time of the collision. The fireman of the passenger train was killed and 26 passengers and two employees were injured. The inspector found much loose practice in the management of the freight, the principal excuse for encroaching on the time of the passenger train being that the station operator had said to one of the brakemen that 141 was about 30 minutes

late. The east switch was set for the side track and the distant signal was set against the passenger train, but the engineman disregarded it. He said that he had often found these signals set against him when the switch was straight. There are 111 signals of this kind on this division and surprise tests are made; but no record of these tests is kept. The superintendent said that no case had come to his attention where an engineman had disregarded a caution indication at a distant switch signal.

Southern Pacific, Montalvo, Cal., September 22. Side collision about 8:35 p. m.; one engineman and one fireman killed; 29 passengers and seven employees injured. Eastbound passenger train No. 38, moving from a wye to the main line, fouled the main line just as eastbound passenger No. 78, a heavy train, came along at 40 or 50 miles an hour; and both locomotives were overturned. There was a dense fog at the time. The engineman of No. 38 said that after stopping at the approach to the main line to give time for a brakeman to run forward and look at the switch indicator, he started along, having been told by the fireman to come ahead; the supposition being that the fireman had received a hand-motion signal from the brakeman; but the fireman was killed in the wreck, and the brakeman says that he had not given any signal. He said that he had not yet reached the switch indicator when the collision occurred. The brakeman thinks that the locomotive had drifted over the fouling point of the main line before coming to a stop. The only way to give credence to the engineman's statement is to assume that the fireman had seen a motion of some light which he took for a proceed signal; the brakeman says that he was carrying his lantern in such a position that it could not have been seen by the fireman.

Gantry Crane for Handling Heavy Freight

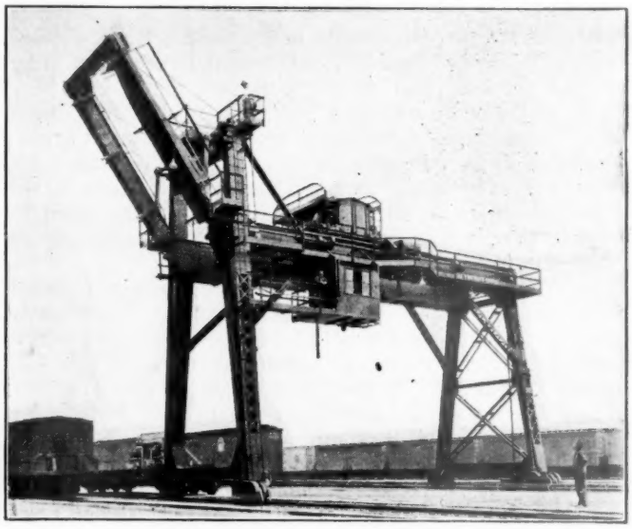
AN ELECTRIC gantry crane has been erected by the Niles-Bement-Pond Company in a busy freight yard near New York, as shown in the illustrations. This crane, embodying modern features of construction throughout, covers three tracks with two driveways, approachable from either direction, with trackage space for 15 cars at the crane. With a lifting capacity of 40 tons, the crane furnishes ample facilities for handling heavy freight, such as structural iron, building materials, machinery, boilers, steel freight containers, transformers, etc. An auxiliary hoist is provided, having 10 tons capacity.



New 40-Ton Niles Gantry Crane Unloading Container Car Section

The span, center to center of the runway rails, is 49 ft. 3 in. With the cantilever extension at one end, the effective reach of the main hoist is increased 19 ft. 6 in., and the effective reach of the auxiliary hoist 21 ft. 11 in. The lift of the hook above the runway rails is 23 ft. The main and auxiliary hoist motors are each 50 hp. The trolley and bridge motors are 10 and 80 hp. respectively. The speeds with maximum full load are: main hoist, 10 ft. per min.; auxiliary hoist, 40 ft. per min.; trolley, 100 ft. per min., and bridge, 80 ft. per min.

The cantilever extension is of the elevating type, being motor-operated from the cage, and is readily elevated to clear any obstruction. Platforms are furnished on both girders running the entire length, including the cantilever extension. A platform is also placed at the top of the shear legs for access to the cantilever elevating mechanism and one on each side of the trolley, which is enclosed for outside service, as is also the cage. The top of the trolley housing is arranged so that any part can be opened on hinged joints, allowing easy access to the trolley mechanism for oiling, etc., or the entire house can be easily removed. The cross platforms are easily lowered on hinged joints, allowing unobstructed access to main and auxiliary hoist drums and gears.



Gantry Crane with Cantilever Extension Placed in Raised Position

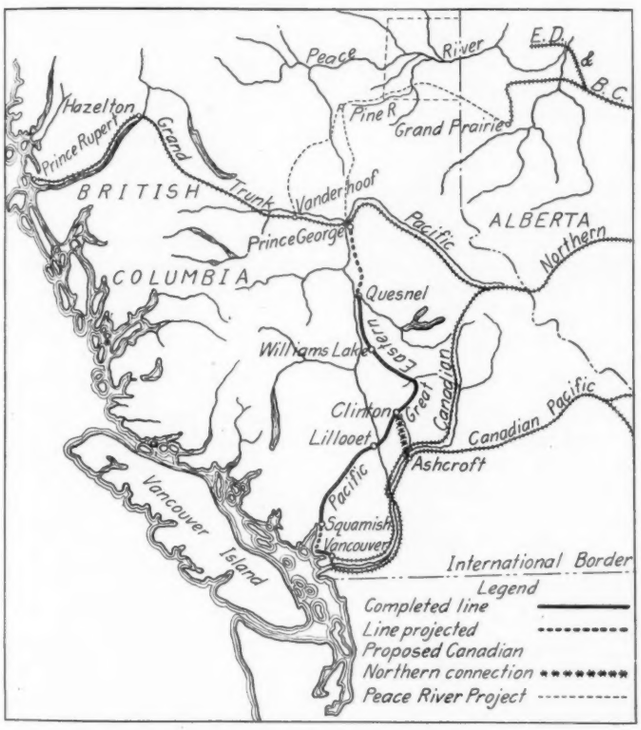
The trolley frame is a self-contained built-up steel structure, with all the mechanism and motors mounted. The trolley is designed to incorporate such improved features of construction as complete lubrication, large wearing surfaces, ample strength and rigidity, self-contained units, easy accessibility and easy handling. The cage is of plate steel construction, special provision being made for mounting the controlling apparatus with concealed wiring. The back of the switchboard is reached through large doors, which, when opened, expose the entire board, allowing ready access to all wiring connections. The crane travels on eight wheels, four at each end. Two of the wheels at each end are driven and the others trail.

The installation of cranes of this type insures the prompt unloading and placing on trucks of all classes of heavy freight from any one of 15 cars available in the shortest possible space of time, thereby solving in a large measure freight congestion at terminal warehouses. There is an important saving of time and cost in handling heavy freight, and in addition it is moved more promptly to the consignee's premises.

Abandonment of Pacific Great Eastern Is Urged

J. G. Sullivan Advises Giving Up Line Unless People Are Willing to Pay Large Annual Deficit

CONTRARY to the advice of the counsel it employed, the province of British Columbia has decided to continue the operation of the Pacific Great Eastern, a province owned line, extending from Squamish, B. C., a small village on Howe Sound, to Quesnel, in the heart of the Cariboo placer mining district, a total distance of 362 miles, and to proceed with a program of extensions and betterments. John Oliver, minister of railways of that province, recently announced this decision before a Liberal convention, stating: "We come of good old British stock and if we can't go through with the maximum of efficiency, we'll muddle it through in the good old British way." He declared that



The Pacific Great Eastern and Adjacent Lines

the Pacific Great Eastern would not be abandoned and that work would be carried on for another year to the end, in order that the taxpayers' investment of $40,000,000 should not be wholly lost. "I'll take my chances. I'll not abandon the road until I have taken stock and have satisfied myself that we cannot redeem the situation," said the premier.

This step taken by the "Oliver" government is considered one of the most important in the history of that province, noteworthy because the decision reached by the administration was in the face of adverse reports submitted by the three experts who were engaged last spring to investigate the P. G. E. and to determine both its present economic and its potential value. According to one of the investigators, J. G. Sullivan, consulting engineer, Winnipeg, Man., and formerly chief engineer of the Canadian Pacific, western lines: "If the people of British Columbia are not prepared to continue paying from $2,500,000 to $3,000,000 per year on the investment already made, an amount that will be necessary for the next ten years, it is recommended that the line be abandoned at once and what salvage possible be recovered." W. P. Hinton, another investigator, a former general manager of the Grank Trunk Pacific, had very little to say in favor of continued operation, and J. S. Dennis, director of colonization of the Canadian Pacific, stated that the railroad in question could not be expected to pay operating and maintenance costs for many years to come. Inasmuch as all three of the reports presented are somewhat similar in nature and language, this article has been limited to that of Mr. Sullivan, who discusses in detail both the economic and the engineering features of the P. G. E., the substance of which is abstracted below.

Physical Features Adverse to Construction

The physical features of the territory which the Pacific Great Eastern traverses are unfavorable to the construction of a railroad, due largely to the prevalence of much clay, sand, gravel and like materials. Sheer cut banks and the unstable condition of the above materials when wet forced the location out of the valley of the Fraser river (the natural location where low grades might be obtained) to high levels. In climbing out of the valley of the Fraser river and dropping into the valleys of other water-sheds sheer rock bluffs, with rugged contours, were encountered, necessitating comparatively heavy tunneling and a large number of rock cuts, or a loose foundation of clay, sand and gravel, which increased the cost of construction and made maintenance expenses very high. This, combined with the adverse financial conditions at the time of construction, made it impossible to build a line cheaply.

The line is constructed and in operation from North Vancouver to White Cliff, a distance of 12.7 miles, and from Squamish to Quesnel, a distance of 350 miles. From White Cliff to Squamish, a distance of about 29 miles, no construction has been undertaken. This portion of the line follows a very rugged shore of rock bluffs, the cost of construction of which is estimated at $3,500,000 to $4,000,000. From Quesnel north to Prince George the grading is completed with the exception of cleaning out slides that have occurred since the line was first graded some six year ago. The track is laid from Quesnel to Cottonwood river, a distance of 17.5 miles, and also from the junction with the Grand Trunk Pacific (about one mile east of Prince George), to Red Rock Creek, 18 miles south, leaving a gap of 45 miles without track. The track fastenings and ties required for this work are on the ground. The Cottonwood river is to be crossed by a steel viaduct, requiring about 1,225 tons of steel, of which amount 1,130 tons have been fabricated and are now stored at Walkerville, Ont. The cost of this steel and fabrication has been paid for, but before the work can be undertaken, an additional 95 tons must be purchased and reinforced concrete foundations built. In addition, some 8,000,000 ft. b. m. of timber remains to be built in trestles, nearly all of the timber for which is on the ground and paid for excepting about 840,000 ft. b. m. of stringers. The cost of the work necessary to complete the gap and put the line in good operating condition is estimated at $500,000 to $600,000, without taking into consideration about $1,500,000 for new equipment that would also have to be bought, the entire expenditure totaling over $2,000,000. To complete both gaps between North Vancouver and Prince George will require about $6,000,000 of new capital.

The line as built is in accordance with good branch line

standards, having 70-lb. rail on grades of 2 and 2.2 per cent and 60-lb. rail on the lighter grades, all liberally supplied with a good type of tie plates on curves. The bridges and culverts are of wood. On this road 27 wooden spans have also been constructed, varying in length from 60 ft. to 150 ft. with a total length of 3,180 ft. In addition, 27,000,000 ft. b. m. of timber is already in place in wooden trestles and culverts with about 8,000,000 ft. additional b. m. to be placed before the completion of the Quesnel-Prince George gap. To renew the wooden structures with permanent work, such as steel viaducts and trusses, concrete culverts and fills, will cost in excess of $8,000,000. The only alternative is to renew in wood at an enormous maintenance cost and the extra cost of maintenance will about balance the interest charges for more permanent construction.

Financial Condition

The total par value of the outstanding debt is $44,226,403, of which amount $5,925,135 is held by the company. The interest charges for the year ending December 31, 1921, amounted to $1,911,913. The total investment in road and equipment on December 31, 1921, was $38,438,590. This is the net sum on the company's books after $5,618,248 has been credited, this amount being waived in claims against the province. The Government took over the railway and subsidiary companies on the receipt of $750,000 in cash. The assets of the subsidiary companies, the Pacific Coast Eastern Development Company and those of the Pacific Great Eastern Equipment Company, consisting of lands, townsites, docks and wharves, locomotives, cars and stores of various kinds were turned over to the P. G. E. In addition the contractors waived claims to $245,000 in unpaid estimates and $1,647,583 of retained percentages on progress estimates, the whole totaling $5,618,249, which has been credited to the various accounts. Of the $38,438,590 investment, $10,543,530.79 was expended in paying interest charges and the deficit in operating revenues during construction.

The rolling stock of the P. G. E. consists of 12 locomotives adequately assorted for this class of road, although the heaviest engines are about up to the limit that the standard of construction will sustain. Two gas-electric cars and two gas motor cars operate out of North Vancouver. There are 12 passenger, 1 combination and 2 baggage cars in passenger service, and 258 miscellaneous cars in freight service, in addition to 68 cars in company service, the majority of these cars being used for construction purposes. The management claims that the present equipment is sufficient for operation as far as Quesnel, but that if the line is put into operation between Quesnel and Prince George, extra equipment will be necessary.

Revenues and Expenses

During 1921, the Pacific Great Eastern handled 53,351 tons of freight for a total of 4,634,231 ton miles and at a rate of 5.7 cents per ton mile, the revenue per mile of road operated being $844.70. During the same year the company carried 15,290 passengers 1,462,871 passenger miles with total receipts from this business of $63,890, equal to a rate of 4.3 cents per passenger mile. The passenger earnings per mile of road operated were $323.86.

Average number of tons of freight per loaded car mile	16.98
Average number of tons of freight per train mile	89.26
Total gross income from all sources	$484,327.00
Total gross corporate expenses	2,689,205.00
Net corporate loss	$2,204,878.00

Of this amount $1,911,913 was charged to interest during construction and $292,965 to operating loss. As $88,632 was earned from rent of equipment in construction during the year the actual loss or deficit in operation for the year should be increased by that amount.

If the road is to be completed between North Vancouver and Prince George it will require $6,000,000 of new capital, and an additional $8,000,000 within the next ten years to replace wooden structures. Adding this to the present investment of $38,438,950 will give a total final investment of $52,538,950 for 470 miles of line, or nearly $112,000 per mile, the interest charges on which will be over $5,500 per mile of road. If the Quesnel-Prince George gap only is completed, the new capital investment will only be $10,000,000, making a total of $48,438,950 for approximately 440 miles of road, or $110,000 per mile of road, and the interest charges will be nearly $5,500 per mile of road. If no more construction is done and the line from Quesnel to Prince George is abandoned, there should be at least $250,000 salvage, and to replace the wooden structures south of Quesnel should not require over $6,500,000. In this case the total investment would be $44,688,950 for 360 miles of road or an investment of $124,000 per mile, and the interest charges would be over $6,100 per mile of road. Therefore, regardless of what action the company may decide upon, it is faced with an ultimate interest charge of about $5,500 per mile of road, which some one, either the taxpayers of British Columbia or the patrons of the road, must pay in addition to the cost of operating the road.

Inasmuch as the Canadian National has a much shorter and much cheaper line to operate to Vancouver than via the P. G. E. connection, no business of any moment can be expected from that source, and the P. G. E. must depend almost entirely on business developed along its own lines. During 1921 the outbound freight from the line amounted to 36,505 tons. As a local line between Vancouver or Squamish and Prince George, the country will not produce enough traffic at any reasonable rate to pay operating expenses, plus a fixed charge.

Questions of Abandonment—Construction—Leasing

Owing to the nonproductive nature of the country for a distance of over 100 miles south of Clinton, a plan is being considered by the province whereby that portion of the line would be abandoned and an extension constructed from Clinton to Ashcroft to connect with either the Canadian National or the Canadian Pacific. The total receipts from freight, both forwarded and received, on this section during 1921 (after the line has been in operation for a number of years) did not exceed $400 per mile. There are over 8,000,000 ft. b. m. of timber in trestles and about 1,000,000 ft. b. m. in truss spans on this section that will have to be renewed within a few years, besides the timber foundations at the crossing of the Fraser River at Lillcost. The cost of the proposed line will not be less than $3,500,000, which will increase fixed charges by at least $175,000 per year. Nevertheless, it is advisable that the entire line south of Clinton should be abandoned, providing the timber interests at the south end cannot raise enough money to purchase any portion of the south end cut of Squamish at a cost of from $15,000 to $20,000 per mile. If this portion of the line will not pay interest on that sum it should be abandoned. The salvage should amount to about half the cost of the Clinton cutoff. The savings in operating expenses and in renewals on the abandoned line would show a substantial reduction over the interest on half the cost of the Clinton-Ashcroft line.

It is also advisable that the line between Quesnel and Prince George be abandoned because an expenditure of $2,000,000 would be required to complete this line and to acquire sufficient rolling stock to meet the operating expenses and the traffic to be derived from the completion of this route will not justify the necessary construction. This same argument holds true in reference to the proposed extension from Prince George to the Peace river country.

It has been suggested that one of the larger connecting lines might be induced to take over the Pacific Great East-

ern and operate it as a feeder line. The road, however, with its limited traffic collected from the local inland points, is of no value to a trunk line. In 1921, the total inward and forwarded freight handled through Vancouver for the P. G. E. was only approximately 36,000 tons. If it is assumed that the 36,000 tons would be hauled an average distance by a trunk line of, say 450 miles, and that the rate received would be 25 per cent greater than the average rate per ton mile, say 1.5 cents, then the 16,200,000 ton miles this traffic would make on the above assumptions, would bring in a revenue of $243,000, a sum less than two-thirds the deficit in the cost of operating the P. G. E. in 1921. The P. G. E. has no strategic advantages, excepting the possibility that if there should ever arise a demand for an Alaskan rail connection, the line would become a link.

Mr. Sullivan's Conclusions

In the concluding words of his report, Mr. Sullivan states that it is impossible for the Pacific Great Eastern to meet expenses in the near future. It certainly cannot be done if the present method of financing is followed, that is, charging to capital the accrued interest and deficit in operating expreses, for the interest charges will increase faster than the business. The results of the investigation show that the total indebtedness at the end of ten years will be nearly doubled without taking into account the extra expenditure that would be necessary to purchase sufficient new equipment to handle a greatly increased business.

Among the suggestions by Mr. Sullivan in addition to those referred to above are the following:

"Abandon the operation of steam trains for passenger and express business and replace them by gas driven motor cars. To raise money for the necessary expenditures, sell some of the locomotives now owned by the company, cancel mail contracts for the winter months and close down that portion of the line where snow trouble occurs during the winter months. Operate a freight train as often as there is business to warrant during the summer months, be that one a fortnight or one a month. Do not send out an engine unless there is a full load at least in one direction. Raise rates, both passenger and freight, to all that the traffic will bear, that is, meet competition. Stop hauling freight at less than cost, to say nothing of paying interest charges. Encourage development as much as possible by giving commodity rates to low grade freight as long as it can bear a rate slightly above cost."

Victorian Railways Consolidate Departments

Signal and Telegraph Branches Combined In One Organization to Prevent Overlapping of Duties

A SEPARATE SIGNAL and telegraph branch has been formed by the commissioners of the Victorian Government Railways, Australia, which was made effective July 1, 1922. The branch comes under the control of the chief engineer of signals and telegraphs, F. M. Calcutt, who reports direct to the commissioners. Prior to the formation of the branch, the signal department was a division of the way and works branch, and came under the engineer of signals reporting to the chief engineer of way and works; and the telegraph department from 1919 has been a section of the electrical engineering branch under the chief electrical engineer, but before that date it was a separate branch under a telegraph superintendent. Owing to the overlapping of duties between the two branches and to provide more efficient and economical working, it was decided to form a separate branch to be responsible for all matters pertaining to traffic protection on the railways.

Organization of the Branch

The accompanying chart shows the organization of the new branch. The clerical staff is in charge of a chief clerk. The engineering staff comes under four headings. The technical and drawing office staff engaged on mechanical signaling and interlocking, power signaling and all kindred electrical circuit work, and mechanical and electrical design is under the supervision of the office engineer. Immediately under the office engineer are a circuit checker and a locking checker, who are responsible for the correctness of the circuit and locking plans issued, and an officer in charge of each division of the drawing office work. The installation of power and automatic signaling is in charge of the power signal construction engineer, who has under him the signal supervisors and the staff required for this purpose.

The maintenance of all apparatus connected with the branch is in charge of the signal and telegraph maintenance engineer. The telephone and telegraph engineer and the power and lighting engineer report to the maintenance engineer on all technical details connected with their portion of the work. The state is divided into eight districts for maintenance purposes, and each district is in charge of a signal and telegraph supervisor. The arrangement of the maintenance staff is shown in the chart.

A bonding supervisor is located in the metropolitan area and is responsible to the maintenance engineer for installing and maintaining the traction bonding and the overhead structure, ground connections, etc., the staff required for this purpose coming under his charge. A testing officer is under the maintenance engineer for conducting all electrical tests connected with signaling and kindred matters. All large construction work, as well as some of the larger maintenance renewal work, is carried out by construction supervisors, who have their headquarters at Melbourne.

Facilities Handled

The signal and telegraph branch is responsible for the installation and maintenance of:

Signaling and interlocking appliances, telegraphs, telephones, and the pole lines and wires required for these purposes.

Traction bonding, cable trunking and overhead structure and ground connections required for the Melbourne electrified railways. Electric bells (with the exception of those used in the railway power-houses and the different substations), electric clocks and clock controls, train describers, train departure clocks and indicators, fire alarms and time recorders.

Gas, lux and kerosene lighting at stations, road crossings, depots, etc., including stationary Pintsch gas holders and gas pipe lines.

Outside the electrified area, all electric lighting and (with a few exceptions) all electric power required for railway purposes.

The erection and maintenance of signal boxes and all buildings required by the signal and telegraph branch, as

well as the painting of signal masts and fittings, will continue to be carried out by the way and works branch.

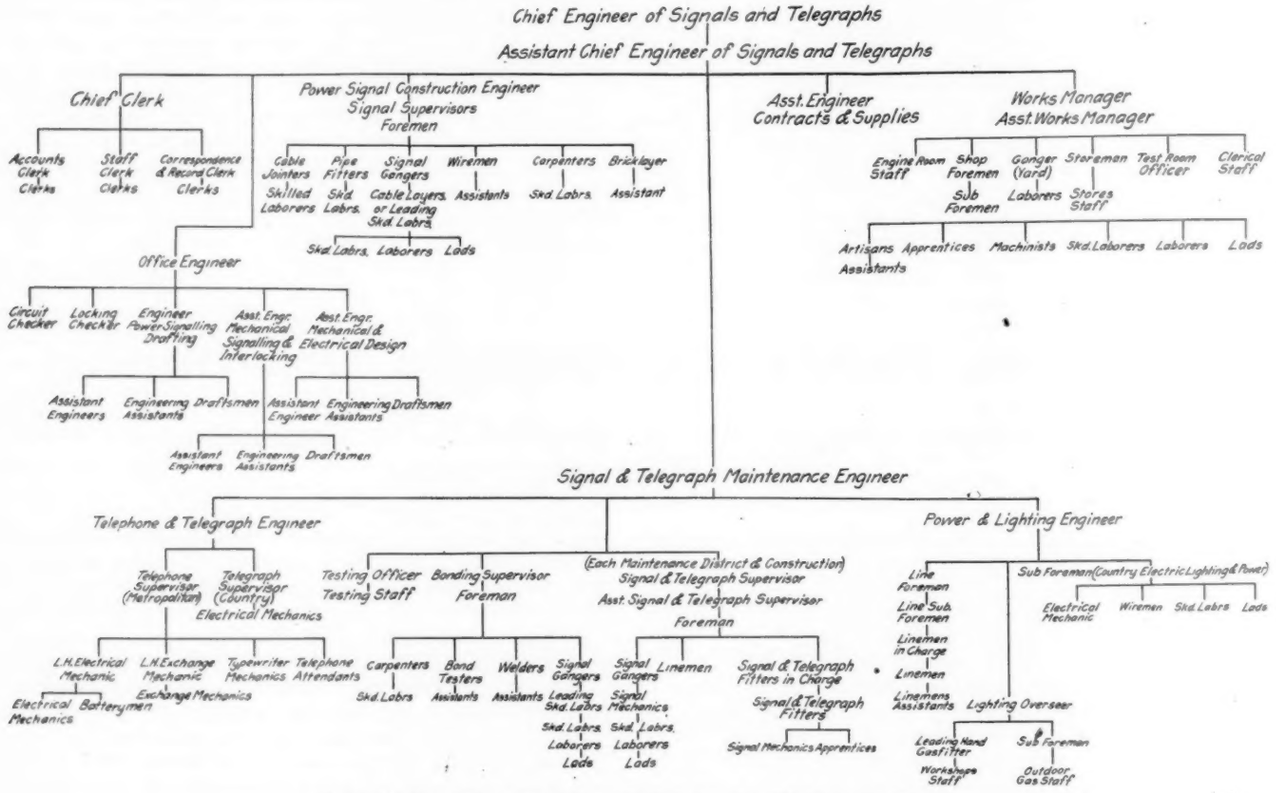
Apparatus in Service

On June 30, 1921, there were on the 5 ft. 3 in. track gage lines 8,102 interlocked levers over a route mileage of 4,274 miles, 3,944 miles of which were single track, with 5,801 signals, 5,012 switches, and 1,087 lock bars. Train protection appliances were installed on 3,520 miles, there being 582 electric staff and tablet instruments, 317 Winter's block instruments, etc., and 1,092 track circuits. Within the Melbourne suburban area there were in service on June 30, 1922, 359 left-hand, upper-quadrant, three-position signal mechanisms and 75 color-light signals, with 296 train stop mechanisms, on 38 miles of double track.

A 2,200-volt a.c. signal transmission and 110-volt a.c. signal operation circuits are used on the 1,500-volt d.c. operated traction system. One electro-mechanical interlocking frame, containing 32 levers, has been in service for the past six years; and an electric interlocking frame, containing 55 levers, is being installed in the central area, where the traffic is exceptionally heavy. At present one electric switch mechanism—operating with 110-volt a.c. energy—is in service, which has been installed for experimental and observation purposes prior to equipping a large plant with such mechanisms. The test has proved satisfactory. A section of single-line automatic signaling is in service for 3.5 miles between Upper Fern Tree Gully and Belgrave on the 2 ft. 6 in. narrow gage railway.

Telegraph and Telephone Equipment

On June 30, 1922, there were 7,719 miles of telegraph and telephone wire, with 2,738 miles of wire used for electric staff and block working, electric bells and signal repeaters. In addition to the railway wires, there were 7,678 miles of postal wire carried on the railway poles and maintained by the railway. There were 876 miles of railway telegraph and telephone wire carried on postal poles and maintained by the Commonwealth Government postal department. There are 3,686 miles of pole line on railway property. There are nearly 400 telegraph stations in operation, and, excluding automatic telephone exchange connections, there are 3,700 telephones. An automatic telephone exchange, with a capacity of 500 lines, is located in the head offices of the railway administration at Melbourne, and this has been in service for the last 10 years, being one of the heaviest worked switchboard installations in Australia and having a switching capacity of 40 per cent. Another automatic telephone exchange, having a capacity of 50 lines, has been installed in the principal railway sub-station for the exclusive use of the services required by the electrified railway system.



Organization Chart Showing Definitely the Division of Duties

Shops and Stores

It is the policy of the railways commissioners to manufacture such material as can be economically done, with the exception of all appliances which are highly specialized. At the signal shops located at Newport, seven miles from Melbourne, all interlocking frames, signal fittings, a large portion of the apparatus required for power signaling, etc., are manufactured. The telegraph workshops now located at Melbourne are to be transferred to Newport and combined with the present signal shops to form the signal and telegraph workshops. The workshops are under the control of the works manager, who reports to the assistant chief engineer of signals and telegraphs. The works manager, who has an assistant, is responsible for the manufacture and repair of materials, and supervises the requisition and issue of all stores connected with the branch. About 510 men are employed at present in the combined shops. An assistant engineer, reporting to the assistant chief engineer, is in charge of all contracts between the branch and outside firms. He is responsible for the preparation of all specifications for public tender, and co-operates between the different engineers and the workshops for the prompt supply of material.

The Fundamentals of Good Organization*

These Must Be Kept Clearly and Constantly in Mind to Insure Efficient and Economic Operation

By R. N. Begien
General Manager, Western Lines Baltimore & Ohio, Cincinnati, O.

MAXIMUM EARNINGS and minimum expenses are impossible unless a railroad is carefully organized, and officers and men thoroughly understand that deviation from the rules of proper procedure will not be tolerated. Every officer should understand clearly for what duties and results he is held responsible. He should not be excused from such responsibility on any pretext whatsoever. His superior should deal with him only, and he should never run around or ignore any officer, subordinate or superior. If responsibility is definitely fixed from top to bottom and a definite plan of action is made, an organization of ordinary men will accomplish far better results than the same number of brilliant men, each working hard to carry out his own ideas.

It is not possible to realize a high standard unless it is known what constitutes it. In a railroad organization some one has to fix the standard. Only one person can do it and he is the chief executive. It is important, therefore, that he should be a man who knows what a high standard is. If he selects a staff of men who are able to measure up to his ideals and who know what they are, he has made good progress.

Each man of the staff has his own special department, but he must conduct his department in such a way as to meet the standards of his chief. If an executive has selected his aids with a view to having them carry out his plans and ideas it may be necessary to go only into the question of standards, without consideration of methods of attainment. Instruction in method is generally necessary, however. Promotion generally comes to a man as soon as he has learned the importance of correct standards and organization, so that new men have to be educated constantly. Above all, a subordinate should never see that the standard of his chief has been lowered.

An Accurate Sense of Justice

An accurate sense of justice is a valuable asset for any man. Without it a man is disqualified for an executive position. Some men have an excellent idea of justice when they are calm, but become unjust when they are disturbed in mind. A superior should never frighten a subordinate. If the chief makes no impression on his subordinate, then it is evident that the latter has but little regard for what he says. If his remarks do make an impression they will probably be passed on to subordinates.

If the chief is cross or excitable he usually says things he does not mean and leaves his subordinate with an uncertain feeling of what is required. He does not fill his man with a desire to accomplish much good, but he does often make make him realize that his job hangs by a thread. He thus has a confused man who is frightened. Such a man will usually pass it on to his subordinates and it will go on down the line. The length of time that it takes to disorganize a job will be in direct proportion to the number of times the "boss" explodes.

An organization of more than 10,000 men needs only about six steps from the top to the bottom. It will be conceded that one man is capable of supervising the actions of ten men. In addition he can educate them in the standards of his chief.

Look at this—

1	Chief officer
10	Vice chiefs
100	Heads of departments
1,000	Sub-heads
10,000	Bosses
100,000	Men
111,111	Total

Some railroads have more steps than shown; some have less. Thus the laborer on a section has only five steps to the presidency of a railroad. As there are only six grades from top to bottom, only four men have to interpret the words of the president before the man on the track is working according to the standards laid down by the president.

The selection of the subordinates in sequence is a most important matter. If a 100 per cent officer selects 100 per cent assistants the result is 100 per cent performance. If a 90 per cent general superintendent selects a 90 per cent superintendent, and he selects a 90 per cent division engineer, who employs a 90 per cent supervisor, who hires a 90 per cent foreman and 90 per cent men, the result is a 53 per cent result.

It should be remembered that the highest officer is the standard bearer and his men are rarely ever any bigger than he is.

In other words, it is hardly possible for a 90 per cent officer to have a 100 per cent assistant for any length of time. They would probably change places if the relation was true, unless the chief raised his own standard to 100 per cent.

Men are largely what we expect them to be. It is perfectly evident to anyone who gives the matter thought, that if a subordinate feels that a mediocre performance is satisfactory to his chief, he has no incentive to produce more than a mediocre performance. Much can be gained by expecting a great deal of subordinates, as they will then make an effort to realize what is expected.

The Principal Function of a Railroad

A railroad is a highly organized body. Unless care is taken in placing competent supervision in every part of the organization, the effect will be felt in other parts of the organization. An expensive and expert staff may evolve fine plans for economy, but they can not be carried out by a disorganized force. Proper organization will make expenses lower and earnings better at once, for it will then be possible to carry out a plan. It is important to remember that if a feasible plan cannot be carried out it is nearly always due to defective organization. For example, a bridge gang repairing a bridge may delay operations to the extent that the effects are felt over the entire railroad.

It is not unusual for a bridge gang or in fact for those who supervise bridge gangs, to feel that the railroad is operated very largely for the purpose of supporting the bridge gang, while we all know that the work of these gangs is entirely subordinate to the principal function of running a railroad—the handling of cars. From an economical standpoint it is always cheaper and better to delay the work of a

*From a paper read before the convention of the American Railway Bridge and Building Association at Cincinnati, O., on October 18.

bridge gang than to allow the bridge gang to delay the work of the railroad in serving the public.

It is not enough that an officer or a sub-officer is competent in the discharge of his own immediate duties. It is his chief duty to see to it that his force is competent, able and willing to do the things that are assigned to them to do in the best possible manner, and if he does not have such men he is negligent in the most important part of his duties.

Men should not be replaced indiscriminately, as it is often a fact that little good is accomplished by making a change. It should first be determined that a more suitable man than the one at present occupying the position is available, and the one who is now occupying the position cannot be made available by proper instruction. If men are made to feel that nothing but a high standard of performance will be satisfactory, they are bound to improve.

Therefore it is important to do the following things: (1) Study the staff with a view to knowing that they are performing their duties properly; (2) If they are not performing their duties properly ascertain if they can be instructed in such a way as to improve them; (3) If they are not suitable men for the positions which they are now occupying, and cannot be made to be suitable men, find out if there is any one who is suitable, or can be made suitable; (4) Impress subordinates with the fact that they should expect the same things of their subordinates as is expected of them; (5) Make subordinates feel responsible for the results in their departments. Encourage them in every possible way to take responsibility onto themselves. Do not spare praise in cases of successful administration, and in cases of failure try to find out what is the matter and help them work out a solution of the problem.

Every officer should understand it is not sufficient merely to state that the cause of some failure to perform a duty properly was that some of his subordinates did not carry out instruction. If the organization is a proper one excuses of this kind will gradually disappear.

In a divisional organization, the superintendent should assign each member of his staff to definite duties and definite territories wherever possible. The object of such assignments is for the better delegation of work and for the fixing of specific responsibility.

Strictly Up to the Chief

The chief of each branch must feel that the results to be secured are strictly up to him. On the other hand, he should not be hampered in his work, and excepting that he should conform to certain standards which are laid down by his superior officers, he should be allowed to use his judgment, which is equivalent to asking him to exercise his ingenuity.

No officer should fall into the habit of dodging an issue. In his dealings with subordinates or others he should never speak of having referred a question at issue to anyone for a decision. To others his own judgment is the only one that should be asked for or should be given. If it should become necessary for him to ask for a ruling or advice, that should be a matter strictly between him and his superior officer.

It is important that new officers and employees be instructed in their duties before being allowed to fill a position. One naturally thinks that all new officers and employees are instructed in their duties prior to appointment, but it is too often the case that this is not a fact. It is true that some classes of employees are handed books of rules, and are examined upon them, but that does not constitute instructions in their duties. Good men often fail to fill positions on account of the fact that they are not instructed. Failure may occur on account of being over-zealous, or of being backward to the point of laziness.

If a man is fit to be advanced at the start he generally is able to advance further and it is a serious reflection on his superiors if he fails. He must not be allowed to fail; it is the duty of his superior to train him and it should be impossible for men to be good men for a time and all of a sudden be discharged or demoted as unfit.

Notwithstanding the importance of organization, the personnel is, generally speaking, the last thing which should be disturbed. Where improvement is demanded it is better to mold the existing personnel into a proper organization and then see if the men can be brought up to the standard as individuals. Where there is disorganization it should be remembered that men of ability are often not able to work to any degree of efficiency on account of this. When the form of organization is improved the efficiency of the individual has a chance to assert itself.

It is necessary for every executive to form habits of thoroughness and concentration that will make it possible to compare values carefully. It is far easier to let things go along as they are than to organize and put into effect new ideas, but new ideas must be carried out. When an officer thoroughly realizes that betterments are possible in almost all operations he has reached a satisfactory starting point. It is certain that if his mind is made up that present conditions cannot be improved, he will waste a lot of time trying to prove that he is right. The first thing that an officer needs is the desire to accomplish things. A great personal desire to accomplish something is the strongest moving impulse that is known. It is greater than fear of punishment or hope of reward.

Some men are skilful in carrying out their own ideas but have difficulty in getting into the proper frame of mind to carry out the ideas suggested by another. It is less difficult to get an idea carried out if by the power of suggestion a man may be led to believe that he himself originated it.

Dealing With Employees

Discipline should be firm but not harsh. Adhere rigidly to the contract if there is one. In dealing with organized labor do not adopt an air of antagonism. Organized labor is here to stay, and there are features in its favor that may be and can be turned to the advantage of a railroad company, or any other company employing it. The wide influence of these organizations holds down complaints from individual employees and has standardized practice in the discipline of men that is not without benefit to the employer.

Rates of pay and working conditions may be subject of controversy, but the local officer is chiefly concerned with the administration of the rules as laid down in the contract. In dealing with committees, courteous treatment and a disposition to hear their side of the case fairly will help the relation of officers and employees materially. It is not strange that the interpretation of the contract should be the subject of dissension. The contracts and their interpretations have grown in size and complexity. It should be remembered that thousands of lawyers make a living by telling citizens what their rights are under the Constitution of the United States and its various branches and interpretations. It could hardly be supposed that a few railroad men could draw up anything as complicated as a wage schedule without serious complications and differences of opinion.

The foregoing is largely fundamental; but it must be realized that until the fundamental conditions have been made correct it will not be possible to plan economies and carry them out successfully. Even then it should be remembered that large organizations absorb changes slowly. To get best results take up one thing at a time and correct the trouble in that. With each difficulty overcome other things will be benefited. Work slowly enough to observe fully the effect of innovations. Do not expect results too quickly.

It is possible that officers think a great deal of their own attitude toward men of the rank and file and pay too little attention to what employees think of the officers and the company in general. It is certain that if a man likes his officers

and is proud of the company for which he works, he will do much better work and form a better part of the whole organization than if he is dissatisfied and displeased with his "boss."

The rank and file know but little of the officers at the head of a large organization. They deal entirely with their foremen and it is generally the foreman, or his boss, who gives a man his idea of the company or concern he is working for. Since the man under discussion, in many instances, is the one who performs the manual work, for the purpose of getting results it is most important that he should be handled well and be in a proper frame of mind.

The laboring man prizes most good working conditions, a steady job, a boss who knows how to handle men properly, and delivery of his pay envelope with regularity. In times of stress I have seen labor troubles of considerable size generated by failure of the paymaster to deliver the pay envelope on time, and it is worth the earnest thought of men in charge of organization to make a plan that will result in the men being paid with regularity.

Motor Truck Competition

THE HOUSTON, TEX., chapter of the American Association of Engineers has arranged for a series of addresses on the motor truck as a competitor of the railways. The first of this series was presented on October 11, by J. D. Fauntleroy, state highway engineer of Texas, who spoke from the standpoint of the highway builder. Other speakers scheduled include Julius Kruttschnitt, chairman of the executive committee of the Southern Pacific, who will present the views of the railway executive; F. J. Feight, president of the Teche Transfer Co., Jeanerette, La., who will present the truck users' view, and J. B. Culbertson, president of the Wichita Motors Co., Wichita Falls, Tex., who will speak from the standpoint of the truck builder. An abstract of Mr. Fauntleroy's paper follows.

We have no exact figures as to the total number of trucks which are operated in the state for the purpose of carrying freight, but the following figures are interesting. Smith county reports that truck traffic has increased 100 per cent since its highways were improved two years ago. Four large grocery houses are now handling 60 per cent of their outgoing freight in trucks. One large concern with 14 branch houses uses trucks extensively in handling its goods between branch houses in trucks operated by the firm. Only 40 per cent of its goods are handled by railroads or by wagons. Another large wholesale firm handles 65 per cent of its outgoing freight in trucks and also delivers to customers in trucks, because it is claimed that in this manner it can make much faster deliveries than can be secured by railroads.

El Paso county reports that for the past two years a truck line of four trucks has operated regularly between El Paso and Las Cruces, N. M., 48 miles, and has given good service, picking up inbound and delivering outbound freight of any class, such as milk, calves, potatoes or manufactured products. The delivery is from farm to store or vice versa. Deliveries are prompt. On account of this truck line we are informed that the Santa Fe now handles freight between these two points only in carload lots.

The operation of trucks has had an appreciable effect on the freight traffic of the railroads. All material used in building the Alamo Gordo road was hauled in trucks, as that method was cheaper than the railroad haul. All cement used in the construction of the Anthony-Las Cruces highways was hauled in trucks direct from the plant at a considerable saving. All lumber dealers in El Paso make delivery of materials by trucks to any place in the county. Oil companies in like manner use trucks to deliver gasoline and oil to any point desired in the county. Coca Cola is delivered in the same way. All local hay is brought in trucks or by wagons and no hay is shipped by rail to El Paso except for rebilling to other points. This applies to practically all other farm products. On a rough estimate it appears that the local freight business done by the railroads today is 10 per cent of the total local freight handled within a radius of 100 miles of El Paso.

Motor Trucks Perform Valuable Service for Short Hauls

There are approximately 26,000,000 food producers in the United States who are trying to feed themselves and also the other 79,000,000 American citizens. We should therefore welcome any new means of transportation that will simplify the transportation of food products to consumer and thereby tend to lower the cost of living, for at present the original producer gets only 35 cents out of every dollar which the consumer pays for his goods. It appears that, especially in the case of fruits, vegetables and other perishable products, the motor truck has a special and very necessary function to perform and if it can cheapen the price of food to the consumer and at the same time cut out the middleman so as to give the producer a better price for his products, it will be entitled to fair treatment by our lawmakers.

It is interesting in this connection to consider that the Public Service Commission of Nevada, in the case of the Virginia & Truckee Railway Company vs. Ginocchio Brothers to restrain the latter from operating a truck line along a road parallel to the railroad and competing with it, ruled that railroad freight service for short distances in less than carload lots has become wasteful and obsolete and it welcomed the addition of the truck service for agriculture, live stock and mining sections of the state and recommended that the railroads install similar facilities.

While the use of motor trucks for carrying freight undoubtedly has proved beneficial to many merchants and their customers, it also has its corresponding disadvantages. For example, many gravel and iron ore roads, which were built with the expectation of carrying ordinary farm traffic and a reasonable amount of auto traffic, have been damaged and some of them almost destroyed in a short time by the use of heavy trucks. The result is that we have roads now in a bad condition of repair which will require large expenditures to put them in proper shape and for which no funds are in sight. Nevertheless, the bonds which were voted and sold to pay for these roads will not be retired for perhaps 25 or 30 years. The condition is a very serious one.

The state legislature has prescribed laws regulating traffic upon highways, but the enforcing of these rules rests with the commissioners' courts of the different counties and in many instances it seems that little or no effort is being made to carry out the intention of the legislature. It appears that if the roads are to be adequately protected from destruction by heavy trucks and by overloaded trucks some means must be found to enforce the traffic regulations, probably by giving some central body the necessary authority to see that the laws are enforced.

The State of Maryland finds itself in a peculiar condition in that it has the most complete system of improved highways of any State in the Union, but it is surrounded by states whose highways are in more or less completed conditions. Also located around Maryland and near its borders are many large manufacturing cities. As a result a tremendous truck traffic has grown up on the Maryland roads and these trucks are frequently licensed in adjoining states. The general tendency of these trucks is to be overloaded. As a result Maryland authorities found their roads in imminent danger of destruction by these foreign owned trucks. It was decided to try the experiment of weighing each heavily loaded truck to see if it was overloaded and if it was overloaded to fine the owners and to compel the overloaded trucks

then and there to remove part of their loads so as to come within the limits prescribed by the law. Of course the truck drivers cursed and swore, but the highway policeman, after testing the load by means of small portable scales, compelled the drivers to unload a portion of their load alongside the road, where it would lay unprotected until the driver could arrange to haul it to some nearby store or farm house for storage. In a little while there were no more complaints, as one experience of unloading was enough for any driver.

The State Highway Commission of Maryland informs me that in 1918 heavy trucks were permitted to operate over the main highway running north and south through Baltimore and that many of these trucks were overloaded. As a result the road was practically destroyed and had to be reconstructed at a cost of $600,000. If all of the loads carried over the road during this period by these trucks had been within the legal limit the road would not have been destroyed but could have been maintained at a reasonable cost. He estimated that by overloading these trucks instead of using more trucks with lighter loads the truck owners had saved about $16,000, whereas the cost to the state of reconstructing the road was $600,000.

Another matter which is worthy of serious consideration is the fact that many of our main highways parallel railroads and the construction of such highways is largely paid for by the proceeds of district highway bond issues. The railroads, being in the district, necessarily will pay their proportional part of the cost of building these highways. The fees which the trucks pay are in many instances totally inadequate to repair the damage done to the roads by the use of the trucks, so we have the peculiar condition existing that the railroads are helping to pay for the improvement of highways which parallel their lines and which are being destroyed by trucks whose business it is to take traffic away from the railroads.

Motor Trucks Must Pay Their Share of Highway Costs

It seems to be the opinion of many thinking men that not until the truck operator shall contribute his due proportion to the cost of highway construction and maintenance, can his right to use the highway be considered equal to that of the ordinary taxpayer. This is the conclusion of the Public Utilities Commission of Colorado in a decision rendered on March 8, 1922. The Colorado Commission held that through abuse of the highways by inadequately taxed buses and trucks, "the 137,336 passenger car owners of the State are grievously wronged" and "the farmer and city home owner pays the bills."

In a similar decision, June 14, 1921, the Public Service Commission of Pennsylvania declared, "public interest would immeasurably suffer" if auto lines were permitted to engage in destructive competition with the railroads that were providing reasonably adequate service to their territories. The Pennsylvania Commission, in a decision on March 16, 1921, refusing to permit an auto line to parallel an electric railway, pointed out that the proposed competition would mean either increased rates or impaired service for the patrons of the electric line.

These decisions are important because they enunciate first principles relating to the regulation and taxation of highway carriers and have a vital bearing on conditions in every western state today.

It may not be amiss to state in this connection that the use of highways by jitneys and bus lines is also having a very serious effect upon the revenues of the railroads. We are informed that due to the general use of jitneys and buses over an improved highway which parallels the Katy railroad, the passenger receipts were $1,500 less at one station in June of this year than in June, 1921.

Our whole system of transportation is in more or less of a transition stage, but the railroads have been of greater value in developing the agricultural, manufacturing and mining resources of our country than any other one factor and their continued operation on a paying basis is essential to the very life and prosperity of our people. The auto has also come to stay and the proper use of the motor truck is going to aid very greatly in the future development of our State.

Both railroads and motor trucks have certain special functions to perform and there appears to be no reason why these functions cannot be performed without conflict and, moreover, to their mutual benefit. The railroads themselves should use motor trucks to a large extent.

New Laws Enacted in 1922

J. E. FAIRBANKS, general secretary of the American Railway Association, acting in behalf of the committee on the relation of railway operation to legislation, has issued a circular giving abstracts of laws of interest to railroads enacted during the year 1922 in the 11 states where the legislatures were in session; and also abstracts of bills introduced but not passed. An abstract in tabular form of the information gathered shows, under 32 heads, 228 laws introduced and 49 enacted. The largest number of laws passed on any one subject was nine, on taxes; there were six under the head of claims, personal injury, etc. From the abstracts of laws passed we condense the following notes of those which are of more general interest:

Georgia changed the name of its railroad commission to the Georgia Public Service Commission, and provided for a tax on public service corporations to support the commission.

Kentucky adopted two laws providing for the elimination of grade crossings and apportionment of the cost of such work; increased the penalty for train wrecking to not less than five nor more than 20 years; gave the state commission increased powers with respect to the regulation of common carriers.

Louisiana adopted a law regulating the jurisdiction of courts over claims for loss or damage to freight.

Maryland repealed the full crew law.

Massachusetts modified the regulation relative to the abandonment of passenger stations, allowing the Department of Public Utilities to authorize exceptions.

New Jersey repealed its full crew law, revised the law concerning passes for officers of the state, empowered the Public Utilities Commission to fix prices of securities to be sold, removed the necessity for municipal approval of railroad police officers and changed to December 10 the date for fixing valuations of railroad property.

New York amended the law relating to cabooses and coal jimmies, amended the law relative to the inspection of locomotives and added a requirement that small concerns operating locomotives shall have them inspected the same as is required of railroads.

Rhode Island adopted a law regulating the operation of jitneys.

South Carolina consolidated the Railroad Commission with the Public Service Commission.

Virginia made changes in its tax laws, and adopted a bill requiring vehicles approaching certain railway grade crossings to be stopped before passing over them.

"STOP THAT LEAK" is the slogan of a campaign which has been started in the Baltimore & Ohio Employees' Magazine to reduce expenses. Officers in all departments are pointing out opportunities for economies in their various fields, and employees are being urged to contribute suggestions.

General News Department

The Pennsylvania reports encouraging progress in repairing freight cars, the output of the shops having increased in six months so that the number of cars requiring repairs was reduced to about nine per cent of the total number owned. In November the daily average number of cars awaiting repairs was 25,056 or 11,614 less than in June.

The Signal Section of the American Railway Association, which holds its next meeting at the Drake Hotel, Chicago, in March, announces that the sessions will occupy three days: Tuesday, Wednesday and Thursday, the 13th, 14th and 15th. Secretary H. S. Balliet expects to mail the committee reports to members on February 12.

The Illinois Central extended Christmas and New Year's greetings to its patrons through the distribution of holiday cards, which were handed to all passengers at the ticket gates. Officers of the road also sent out cards with their letters. They expressed appreciation for patronage and asked continued patronage, confidence and friendship.

Payment of dividends by railroad companies, except after a certificate has been obtained from the Interstate Commerce Commission to the effect that an inspection has been made and the equipment found adequate for the requirements of traffic, would be prohibited by a bill which has been introduced in the Senate by Senator Johnson of California.

Passenger train No. 16 of the Chicago, Burlington & Quincy was derailed three miles east of Saxton, Mo., on December 12, by malicious misplacement of a rail. The rail had been taken out, at one end, and spiked down six inches out of line. A section house had been broken into and a claw-bar and wrench taken out. Although seven of the eight cars of the train left the track, only three passengers were injured and these but slightly.

The Atchison, Topeka & Santa Fe has prepared plans for the construction of a large office building to accommodate its general offices in Chicago on land owned by the company on the east side of State street, south of Roosevelt road. The company's present lease of three floors in the Railway Exchange building will expire in 1923 and it is now considering whether to remain at its present location, to become tenants in the new west side Union Station office building, or to construct its own building.

The Interstate Commerce Commission has announced that the hearing set for January 17 on its consolidation plan as applying to several western systems will be interrupted for two days on account of the argument before the full commission on January 19 and 20 on the application of the Southern Pacific to acquire control of the Central Pacific. On January 17 and 18 evidence will be received with respect to Systems No. 14 and 15 and commencing on January 22 evidence will be received with respect to Systems Nos. 13, 16 and 17 of its tentative plan.

"Company unions" have been formed on the Chicago & Eastern Illinois by shopmen, signalmen and telegraphers; and, in conjunction with officers of the road, have agreed on wages and working conditions. These organizations are the Chicago & Eastern Illinois Association of Mechanical Department Employees and the Chicago & Eastern Illinois Association of Signal and Telegraph Department Employees. The wages agreed upon are in accord with the rulings of the United States Railroad Labor Board, but with provision for graduating the rates of pay according to the skill and experience of various classes of mechanics.

Railway officers and railway supply men of Chicago are participating actively in the campaign of the Chicago Safety Council to secure financial support for that organization, which proposes to spend $100,000 during 1923. F. A. Poor, president of the P. & M. Company is general chairman of the drive. W. E. Sharp, president of the Grip Nut Company, is chairman of the railway supply division conducting the campaign among the railway supply companies. J. G. Rodgers, vice-president of the Pennsylvania, is supervising the work of the steam transportation division, which includes safety officers of nearly all the railroads entering Chicago. The Chicago Safety Council has co-operated with the railroads at every opportunity to minimize accidents. It directed the recent Careful Crossing Campaign of the American Railway Association in Chicago, and plans to conduct three safety instruction classes for railway foremen in 1923.

Hall Three-Color Signals

The Hall Switch & Signal Company has received orders for its color-light signals—a single lens serving for all three colors—from the New York Central (lines west) eight signals; the Michigan Central, three signals; the Toledo & Ohio Central, one signal, and the Baltimore & Ohio, two signals.

Society of Terminal Engineers

The Society of Terminal Engineers will discuss the illumination of piers, warehouses and railroad terminals and yards at its meeting on January 9, at 8:00 p. m., at the Engineering Societies Building, New York. G. T. Johnson, electrical supervisor of the New York, New Haven & Hartford, will speak on the illumination of terminals and yards, giving special attention to the installation at Cedar Hill. H. E. Mahan, illuminating engineering laboratory, General Electric Company, will discuss the illumination of piers and warehouses.

Nine Thousand Foreign-Born Citizens

Of the 12,907 foreign-born employees on the Eastern Region of the Pennsylvania Railroad a total of 9,249 or 70 per cent have either become naturalized American citizens or have obtained their first papers. Forty-eight nationalities are represented; Italians, 5,707; English, 1,610; Irish, 1,444; German, 696; Austrian, 586; Polish, 528; Russian, 511; Hungarian, 338; Norwegian, 177; Spanish, 172; Swedish, 148; Scotch, 139; and Czecho Slovak, 102. The following show less than 100 each: Armenian, Mexican, Portuguese, Canadian, Danish, West Indian, French, Swiss, Jugo Slav, Greek, Syrian, South American, Dutch, Welsh, Roumanian, Belgian, Turkish, Cuban, Lithuanian, Finnish, Bohemian, Australian, Ukranian, Bulgarian, Serbian, East Indian, Macedonian, Galician, Arabian, Porto Rican, Egyptian, Costa Rican, African, Central American and Japanese.

It is the policy of the Pennsylvania to assist all foreign-born employees who wish to take advantage of instruction in English and the fundamental principles of American government.

Unequal Taxes in Nebraska

The Chicago, Burlington & Quincy, the Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha, have been denied a Federal court order enjoining the collection of their taxes for 1921 in Nebraska, based on appraisals and valuations which they claim were discriminatory. The roads claim that their taxes have been assessed on valuations as high as 40 per cent greater than the actual value of their property, while other property in the state was assessed at only 65 per cent of its actual value. The opinion denying the order held that the roads should have exhausted all means provided by state law for correcting the assessment before coming into Federal court for relief. Reference was made to the provision in the Nebraska law for appeal to the State Supreme Court in tax cases after the state board of equalization has acted, which action the roads had not taken.

Readjustment of Wages on U. P.

An agreement has been reached between the Union Pacific and representatives of the Miscellaneous Employees' Association of that system whereby it will pay wages ranging from two to ten cents an hour over those established by the United States Railroad Labor Board to employees performing work of a high degree of skill. For work semi-skilled in nature and other grades requiring but little skill, the rates of pay are less in some instances than rates established by the Labor Board. A complete set of rules governing working conditions was also agreed upon, which are similar to those contained in agreements recently entered into between the Union Pacific and the Shop Employees' Association of that road.

Butler, McChord and Eastman

The Senate on December 21 confirmed the appointment of Pierce Butler as an associate justice of the Supreme Court by a vote of 63 to 7. Those voting against the confirmation were Senators Harris, Heflin, LaFollette, McKellar, Norris, Sheppard and Trammell. In opposing the confirmation, Senator LaFollette is said to have used a letter from John H. Gray, former valuation analyst of the Interstate Commerce Commission, saying that Mr. Butler had caused his dismissal from the faculty of the University of Minnesota because of the attitude he had taken on railroad valuation questions while with the commission. The Senate also confirmed the re-appointment of C. C. McChord and Joseph B. Eastman as members of the Interstate Commerce Commission.

Coal Production

The rate of production of soft coal has declined since the second week of December, according to the Geological Survey Bulletin. Revised estimates for that week show 11,495,000 tons including lignite, coal coked, mine fuel and local sales, whereas the preliminary estimate for the week ended December 16 stands at 10,518,000 tons, and for the week of December 18-23 at 10,000,000 to 10,300,000 tons. The decline began on Tuesday, December 12, when the output was limited by observance of Miners' Election Day in some union districts, and has continued since that day for causes which are not yet apparent.

Production of anthracite in the week ended December 16, including mine fuel, local sales and washery and dredge output is estimated at 2,197,000 net tons, the highest week's output for the year 1922.

The total mine output of bituminous coal in November is estimated at 45,300,000 net tons. This is 8,495,000 tons, or 23 per cent more than the November, 1921, production.

The Lake season is now virtually closed. Cumulative dumpings of cargo coal (bituminous) over Lake Erie piers in the 1922 season to December 17 total 18,500,055 tons which is 17.5 per cent less than in 1921 and 1920, and 15 per cent less than in 1919. It is noteworthy, however, that of the total cargo coal reported for 1922 1,179,417 tons, or 6.4 per cent, has gone to Lake Erie destinations not ordinarily taking "Lake" coal. Therefore, on the basis of regular movements the present season is 22.5 per cent behind 1921 and 1920 and 20 per cent behind 1919.

Constitutionality of Recapture Law Contested

The first suit to test the constitutionality of the so-called recapture provisions of the transportation act has been instituted in the United States district court at Beaumont, Texas, by the Dayton-Goose Creek Railway, which has filed a petition for an injunction to restrain the Interstate Commerce Commission from instituting proceedings to collect from the company $10,833.12 for 1920 and $16,833.49 for 1921, representing one-half of this company's net in excess of 6 per cent upon its value. The petition states that this law is in violation of the fifth amendment to the constitution and declares that its rates were fixed both by the Interstate Commerce Commission and by the Texas Railroad Commission as reasonable rates and that the commissions could not have declared lower rates to be reasonable. It also makes the point that part of its net operating income was not derived from freight or passenger service, but from profits accruing to it from rentals, leases, trackage rights and interest; also that it does not know how much of its net income it may be able to retain as it may eventually be reduced as a result of litigation over rates, damage suits, etc.

Dearborn Station Damaged by Fire

Dearborn Station, Chicago, operated by the Chicago & Western Indiana and used by the Atchison, Topeka & Santa Fe, the Chesapeake & Ohio, the Chicago & Eastern Illinois, the Erie, the Chicago, Indianapolis & Louisville, the Grand Trunk and the Wabash, was damaged by fire to the extent of $300,000 on December 21. The fire was caused by crossed wires and started in the ceiling over the second floor at 3:30 p. m., spreading rapidly to the third floor and loft. The fire was confined to the upper floors of the building which were used for offices and the storage of records. It spread so rapidly that within half an hour the entire upper portion of the building was in flames. The train shed was not damaged and no mail or baggage was lost. As soon as the fire was under control, arrangements were made to handle the heavy holiday traffic with a minimum of inconvenience and delay. By 7 p. m. trains were being handled on schedule and an annex ordinarily used for the accommodation of suburban passengers was used for regular passenger traffic. On December 23 the debris had been cleared so that passengers were able to enter the train shed through the main floor of the building. The baggage and waiting rooms were restored to service on December 24. The station was built in 1885 at a cost of from $400,000 to $500,000, and was considered one of the largest and best appointed stations in the country at that time.

Illinois Central Urges More Intensive Use of Railway Facilities

In an article appearing in the Illinois Central Magazine for December this company points out that relief from the present transportation shortage can be secured only through the more efficient use of present limited facilities. Quoting from this article, relief may be brought about by the loading or unloading of cars the same day they are delivered instead of holding them over into the following day. This company is endeavoring to load cars as heavily as possible. It has been found that only three-fourths of the full capacity of freight cars, except coal cars, is being utilized, which means that one-fourth of the capacity of such cars is being wasted. The co-operation of patrons in assisting in the correction of this condition is solicited. In October, lumber loadings on the Illinois Central were only 58.6 per cent of the capacity of the cars, mixed seed 54.9 per cent, cement 76 per cent, cotton seed products 56.2 per cent, flour and meal 59 per cent, sugar 52.2 per cent and stucco and plaster 75.3 per cent. Coal car loading exceeded 95 per cent of the maximum capacity, wheat and corn 90 per cent and stone, sand and gravel nearly 96 per cent. That the railway is attempting to do its part is indicated by the fact that a record of 45.75 miles per car per day was made in October of 1922, as compared with the previous high record of 44.59 miles per car per day established in October, 1920.

A Bill to Protect I. C. C. Against Influence

A bill to make it unlawful "to attempt to influence the determination of any proceeding before the Interstate Commerce Commission or any examiner thereof, excepting under the rules and regulations of the commission governing its proceedings in the orderly administration of the interstate commerce law" has been introduced in the Senate by Senator La Follette. The bill provides that:

"Every person who attempts to influence the action of the Interstate Commerce Commission or any member thereof, in making or refraining from making any ruling, conclusion, finding, recommendation, report or order in the determination of any proceeding before the commission or any examiner thereof, by writing or sending to the commission or any member thereof or to any examiner thereof any letter or any written or printed communication, circular, paper, or by writing or printing or circulating or causing to be printed and circulated any communication, matter or thing addressed to the commission or any member thereof or any examiner thereof, or by communicating with the commission or any member thereof or any examiner thereof in any

other manner with like purpose and intent in relation to such ruling, conclusion, finding, recommendation, report, order or proceeding pending before the commission or examiner thereof, excepting under the rules and regulations of the commission governing its proceedings in the orderly administration of the Interstate Commerce law and acts amendatory thereof, shall be deemed guilty of a misdemeanor and upon conviction shall be punished by a fine of not more than $2,000 or imprisonment for a term not exceeding one year, or by both fine and imprisonment, in the discretion of the court."

W. H. Johnston Asks Investigation of Strike Expenditures

William H. Johnston, president of the International Association of Machinists, on December 23 filed with the Interstate Commerce Commission a petition requesting the commission to investigate the expenditures by railroad companies for the maintenance of their equipment since July 1, 1922.

"The present freight and passenger rates were originally determined by you on the assumption that adequate standards of economical and efficient operation would be fulfilled by the carriers," he said. "Consequently, if at any time they are not fulfilled, it becomes the duty of your honorable body to act in a way which will record the facts of the situation and effect the necessary remedies. Especially is such action on your part appropriate and necessary at this time, in view of the persistent demand by the agricultural and other shipping interests of the nation for reduced freight rates. I charge that progress toward such reduction has been effectively and consistently blocked by the carriers in recent months as a result of their costly and utterly unwarranted labor policy."

Mr. Johnston said that there exists today not only a depletion of usable cars, coupled with a serious decline in railroad earnings, but also a condition of deferred equipment maintenance which is likewise very serious in view of the coal shortage and the increasingly severe winter weather. He charged that this situation is "the direct result of those very faults of management which the Interstate Commerce Act has made a primary factor in the determination of railroad rates and which the commission, in accordance with this act is authorized to remedy." He calls the present state of affairs "tantamount to a lockout."

"Green Caps" at Pennsylvania Station

The "Message Exchange" introduced at the Grand Central Terminal, New York city, last July, is now in operation also at the Pennsylvania Station, New York, with "Green Cap" messengers circulating among passengers in the waiting rooms and concourse. The announcement issued by the railroad company lists the things that the Exchange and its messengers will do, among which are:

If a patron has failed to telephone an important message to his home or elsewhere, his message can be taken by a messenger. If a reply to the message is required, the Message Exchange will get the answer.

Messages may be left to be called for.

Travelers may have letters and telegrams addressed to themselves in care of the Message Exchange. * * * On request, the Message Exchange will require positive identification of persons to whom valuables are delivered.

Messengers will deliver messages, bags and parcels of all kinds between any two points in Greater New York.

A "Green Cap" will page anyone throughout the Pennsylvania Station. This service can be obtained by telephoning Pennsylvania 0114.

Railroad patrons can have railroad and Pullman tickets purchased and held for them.

The booth is open from 7 a. m. until midnight. For the present its working force consists of a day and a night telephone operator and four messengers. The Exchange during its first two days accommodated approximately one hundred railroad patrons.

The Grand Central announcement said that for all ordinary service the charge would be uniformly ten cents each. The present announcement simply says that a nominal charge will be made.

Traffic News

The navigation season on the upper Great Lakes ended on December 22, when the locks at Sault Ste. Marie, Mich., were closed for the winter.

The Interstate Commerce Commission on December 20 issued a service order directing the Pennsylvania Railroad to place three cars a day for 15 consecutive days at the mine of the Commercial Coal Mining Company, Twin Rock, Pa., for coal consigned to the government fuel yards at Washington. These yards supply all public buildings in Washington.

The Chicago, Burlington & Quincy, the Great Northern and the Northern Pacific, are planning a $1,000,000 campaign to advertise the institutions, the economic resources, the development, the history and the future of the northwest. Officers are now traveling through this territory collecting information which will be used in the campaign. The campaign will be handled through the Burlington offices. A motion picture scenario laid in Colorado, Yellowstone Park and Glacier Park has been completed and will be displayed in cities throughout the United States.

Christmas holiday traffic on the railroads centering in New York City was this year heavier than ever before. The different roads reported estimates of from 20 to 30 per cent above the normal average number of passengers passing through the station on ordinary winter days. The New York Central sent out many extra trains, including 75 extra sleeping cars. An officer of the Pennsylvania said that 50 more Pullman parlor cars could have been used if they could have been found. Similar increases in the aggregate number of passengers were reported also at Philadelphia.

Advice how to fight the boll-weevil is the subject of the latest advertisement published by the Central of Georgia Railway in the daily and weekly newspapers published along its lines. The agricultural department of the road will supply any farmer with all available facts and figures as to how the weevil has been fought, and the results. The only advice given in the advertisement is the naming of the best weapons, which are "hard work and common sense." These must be supplied by the farmer himself, but the railroad, without attempting to say what method is best, and without recommending one plan above another is ready to do what it can. Pamphlets may be obtained on application and personal interviews may be had with the department's agricultural agents at Cuthbert, Griffin, Milledgeville and Columbus. This railway organized its agricultural department in 1911 and has established test farms, has assisted boys' clubs for crop growing and stock raising and has distributed pure-bred sires, cattle and swine, throughout its territory; it has shown how tobacco and other money crops may be grown to bridge over the lean years while the farmer is learning to live with the weevil; it has conducted farm tours through the west; aided in the construction of correctly designed storage houses for sweet potatoes, and is now promoting test pastures to show that permanent pasturage is possible.

Car Service Division Appoints Agricultural Representative

To enable the Car Service Division of the American Railway Association to keep more intimately advised regarding the transportation requirements of the farming communities of the country, it has appointed Elmer Knutson, of St. Cloud, Minn., as agricultural representative, whose function will be to keep in touch with farm needs so far as freight transportation requirements are concerned. He will analyze the movement of agricultural products and will co-operate with farm organizations throughout the country in anticipating car requirements. He will spend most of his time in the agricultural sections of the country. Creation of this office is part of the general plan of the Car Service Division to bring about closer co-operation between shippers and carriers.

Commission and Court News

State Commissions

The Railroad Commission of California will apply to the California Supreme Court for a rehearsing in the Los Angeles terminal case in which the court denied the commission authority to order the construction of a union passenger station. The Supreme Court annulled the order of the commission directing the Southern Pacific, the Atchison, Topeka & Santa Fe and the Los Angeles & Salt Lake to join in the construction of a station as part of a plan for eliminating grade crossings. The Supreme Court, while conceding the power of the Commission to order the elimination of grade crossings, held that the Interstate Commerce Commission possessed exclusive power over all extensions to railroad facilities, including terminals. In the event that the order of the Supreme Court becomes final, the California commission will initiate proceedings before the Interstate Commerce Commission to accomplish the result sought.

Court News

Railroad Company Not Liable for Work Contracted While Under Federal Control

Where a railroad was under federal control when an agreement for construction formerly made was modified and performed, partly by the contractor and partly by the railroad after the contractor's abandonment of the work, the Tennessee Supreme Court holds that the railroad company was not liable for the amount due the contractor under the modified agreement nor for the rental of the contractor's equipment taken and used after the abandonment.—Johnston v. Cincinnati, N. O. & T. P. (Tenn). 240 S. W. 429

Alabama Cattle Guard Statute

The Alabama Court of Appeals holds that under the 1907 statute requiring the erection of cattle guards for plantation roads when demanded and shown to be necessary, two things are essential to recover damages (1) the cattle guards and crossings must be on plantation roads, either present or prospective; (2) there must be a demand by the owner or person in possession, accompanied by a showing that such guards are necessary to prevent depredation of stock upon his land, and that the crossings are necessary for the proper use of the land.—A. T. & N. v. Norwood, etc. Stock Co. (Ala. App.) 92 So. 199.

Consignee, Agent of Shipper, Liable for Deficiency in Freight Though B. L. said P. P.

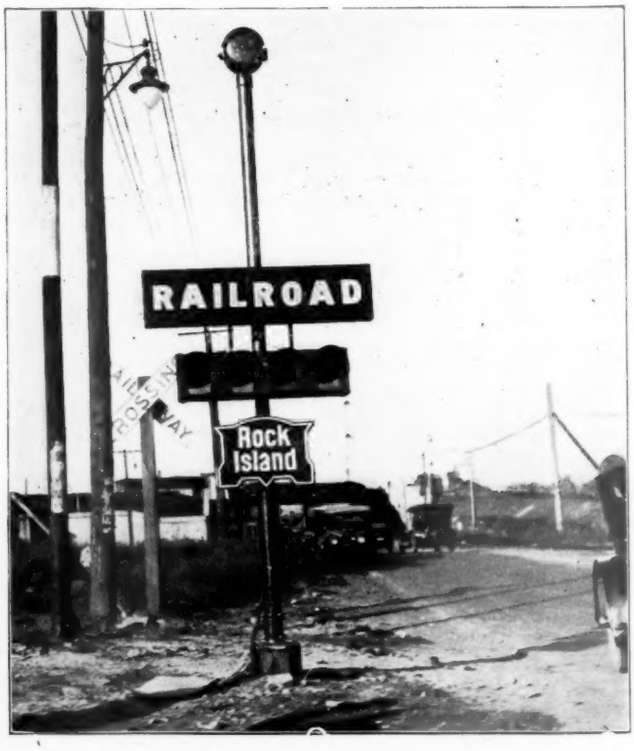
Goods were shipped to the shipper's agent, on a straight bill of lading reciting that the freight had been prepaid. On arrival it was found that the full lawful freight had not been prepaid, and a small additional amount demanded was paid by the consignee "to avoid delay and confusion." Some months later it was discovered that $93 additional was lawfully due, and on the consignee's refusal to pay this, the railroad sued him. The consignee contended that the rule that the consignee accepting the goods is to be treated as assuming the charges cannot apply if the contract of shipment is that the freight is to be prepaid, especially when the railroad knows that the consignee is the shipper's agent. None of the cases in the higher federal courts involves a prepaid shipment, but the federal district court for the Northern District of Georgia in the present case arrives at the conclusion that the consignee cannot accept delivery without incurring liability for the carrier's charges, known or unknown, supposed to be prepaid or otherwise, and no matter what the consignee's actual relation to the shipper is. If by the shipper's omission the consignee is thus made liable for a charge which as between him and the shipper should not be borne by him, his recourse is on the shipper. —Western & Atlantic v. Underwood, 281 Fed. 891.

Ownership of Condemned Land Not Used for Railway Purposes

Certain lands of plaintiff's predecessor in title were condemned in 1879 for railway purposes. Hitherto the defendant company has not used or needed all the land condemned, and a portion of it has been continually occupied and used by the plaintiff and his predecessors. The Kansas Supreme Court holds that, as plaintiff and predecessors were strictly within their rights there has been no adverse, hostile, inconsistent use to the prejudice of the company so as to give rise to a right founded on 15 years' adverse possession, and an action by the fee title holder to quiet the title against the railroad company cannot be maintained.—Harvey v. Missouri Pacific (Kan.), 207 Pac. 761.

Sufficient Excuse for Failure to Furnish Cars

In an action for failure to furnish cars, it was shown the cause of the failure was an unusual demand for cars after a switchmen's strike, which had practically stopped shipments during the preceding months. The Wisconsin Supreme Court holds that a finding that the railroad could, in the exercise of reasonable diligence have furnished the cars without jeopardizing its other business was not warranted. It is undoubtedly the duty of the railroad to notify the shipper within a reasonable time if it cannot furnish the cars at the time and place requested; but where there is no causal relation between failure to give such notice and the damages sustained, it is immaterial that the notice was not given. —Richland Equity Shipping Assn. v. Rock Island (Wis.) 188 N. W. 625.



Underwood & Underwood

When a Train Is Approaching the Four Lights Below the "Railroad" Sign Show "Stop" in Red Letters in the Crossing Signal Developed by A. B. Ramsdell, Assistant Vice-President of the Rock Island

Equipment and Supplies

Locomotives

THE LEHIGH & NEW ENGLAND is inquiring for three Consolidation type locomotives.

THE LOUISVILLE, HENDERSON & ST. LOUIS is inquiring for five Pacific type locomotives.

THE HOLTON INTER-URBAN has ordered one Prairie type locomotive from the American Locomotive Company.

THE NARRAGANSETT PIER RAILROAD has ordered one 8-wheel locomotive from the American Locomotive Company.

Freight Cars

THE UNITED GAS IMPROVEMENT COMPANY, Philadelphia, Pa., reported in the *Railway Age* of December 16 as inquiring for 150 coal cars of 50 tons' capacity, has ordered this equipment from the American Car & Foundry Co.

THE GREAT NORTHERN, reported in the *Railway Age* of December 9 as inquiring for 500, 75-ton steel ore cars, has divided equally an order for 1,500 ore cars between the Pressed Steel Car Company and the Cambria Steel Company. This company is now inquiring for 1,000 U. S. R. A. standard, double-sheathed box cars.

THE SOUTHERN PACIFIC, reported in the *Railway Age* of December 2 as inquiring for 5,000 cars, has ordered 3,700 box from the Standard Steel Car Company, 350 flat from the Ralston Steel Car Company, 550 stock from the Pullman Company. The railroad company will build 300 flat cars and 100 caboose cars in its own shops.

Passenger Cars

THE UNION PACIFIC contemplates coming in the market soon for about 50 cars for passenger service.

Iron and Steel

THE LOUISVILLE & NASHVILLE has ordered 1,599 tons of structural steel for its Rigolets bridge in Louisiana.

THE MISSOURI PACIFIC has ordered two through riveted spans, 700 tons, from the Virginia Bridge & Iron Company.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS will receive bids until January 3 for plates, shapes, nails, wire, cable, axles and tubes.

Track Specialties

THE LONG ISLAND received bids until 12 o'clock noon, December 29, at Jamaica, N. Y., for 420 kegs of track bolts, 1,350 kegs iron track spikes, 36 open hearth frogs, 2 hard frogs, 24 switches and 2 pair alloy tipped switch points.

Miscellaneous

THE NORFOLK & WESTERN received separate bids until 12 o'clock noon, December 27, at Roanoke, Va., for its requirements from January 1 to June 30, 1923, of locomotive steel tires, wire fencing, steel springs, and from January 1 to March 31, of couplers and repair parts. Bids were also received on the same date for 101 cast steel truck bolsters. The company is also asking for separate bids until 12 o'clock noon, January 3, for 550 sheets finished steel, 12 cast steel truck bolsters, 8,000 switch plates, 300 bars bevel reinforcing steel, 100 cast steel side frames, requirements of brake shoes from January 1, 1923, to March 31, 1923.

Supply Trade News

The W. S. Murrian Company, Knoxville, Tenn., has been appointed field representative for the southern part of the United States of the **Mahr Manufacturing Company,** Minneapolis, Minn.

H. A. Hutchins district manager of the Chicago territory for the Thew Shovel Company has become associated with the main office of the **Northwest Engineering Company,** 1220 Steger building, Chicago.

The George Oldham & Son Company, Baltimore, Md., has opened a branch office in the National building, 1404 E. Ninth street, Cleveland, Ohio. This office is in charge of **W. W. Davidson** and **C. M. Hartzell.**

The Lehigh Portland Cement Company has awarded a contract to Dwight P. Robinson & Company, New York, for the design and construction of a Portland cement plant at Birmingham, Ala., having an annual capacity of 1,000,000 barrels of cement.

The Globe Steel Tube Company, Milwaukee, Wis., has opened a southeastern district sales office at 716 Continental building, Baltimore, Md., and **R. R. Lally,** formerly of the National Tube Company, has been appointed district sales agent.

Edwin L. King has been appointed district sales manager for the Reading Steel Casting Company, Inc., Reading, Pa.; Pratt and Cady Company, division Reading Valve and Fittings Company, division, Bridgeport, Conn., with headquarters at 208 South La Salle street, Chicago, to succeed M. L. Chase, resigned.

L. R. Phillips has been appointed district sales manager of the **Detroit Seamless Steel Tubes Company,** Detroit, Mich., and will establish an office in Chicago on January 1. For the past 20 years Mr. Phillips has been associated with the National Tube Company, 17 of which were with the Chicago office, and the latter three with its St. Louis office.

O. D. Street, general manager of distribution of the Western Electric Company, Schenectady, N. Y., has resigned to organize a company of consulting specialists to deal with questions affecting management and distribution. Mr. Street was connected with the Western Electric Company for 22 years, most of the time in an executive capacity.

The Gibb Instrument Company, Bay City, Mich., has taken over, under exclusive license, the manufacture and sale of the automatic and semi-automatic electric arc welding machines developed and heretofore manufactured by the Fred Pabst Company of Milwaukee, under various letters patent, and have contracted to act as selling agent for the Pabst line of patented covered electrodes.

John J. Gault has joined the sales force of the **Bucyrus Company,** South Milwaukee, Wis. Mr. Gault's headquarters will be at 622 McCormick building, Chicago. He formerly served as assistant engineer of the Chicago & North Western, engineer maintenance of way of the Chicago & Alton, construction engineer for the United Fruit Company and assistant engineer of the Chicago, Milwaukee & St. Paul and later with the International Harvester Company as locating engineer on a railroad project.

Walter C. Doering has resigned as vice-president of the Southern Wheel Company, St. Louis, Mo., effective January 1, to engage in the railway supply business in St. Louis. Mr. Doering has been connected with the above company and its predecessor the St. Louis Car Wheel Company since January, 1900. Among the concerns that Mr. Doering will represent, are the American Brake Shoe & Foundry Company, New York, the Bradford Draft Gear Company, New York

and Chicago, and the Republic Railway Equipment Company, Chicago. His offices will be located in the Railway Exchange building, St. Louis.

Obituary

William R. Walker, assistant to the president of the United States Steel Corporation, died on December 22 in St. Luke's Hospital, New York City. Mr. Walker was born in La Porte, Ind., on November 26, 1857. He had been identified with the Steel Corporation since its formation.

Fred A. Marsh, general purchasing agent of the Link-Belt company, died on December 11 at his home in Chicago at the age of 52 years. Mr. Marsh was a member of the Link-Belt organization for over 33 years. He was one of the organizers of the Purchasing Agents Association of Chicago, and served as its first president; he has been for some years a director in the National Association of Purchasing Agents.

Railway Construction

BALTIMORE & OHIO.—This company has awarded a contract recently to the American Bridge Company covering the fabrication and delivery of approximately 750 tons of steelwork for bridge superstructures. The order in question consists principally of deck plate girder spans, but includes a number of short "I" beam spans and one through plate girder span. The majority of these new bridges are to be placed on the line paralleling the Ohio river between Benwood and Brooklyn Junction, W. Va. The material is to be delivered early in the coming spring, and the erection is to proceed as soon as the steelwork reaches the respective bridge sites and the weather conditions become suitable for field operations.

BELT RAILWAY OF CHICAGO.—This company, which was reported in the *Railway Age* of December 16 as receiving bids for the construction of a brick freight house at Chicago to cost $75,000, has awarded the contract for the work to Rowley Brothers Company, Chicago.

CHICAGO & WESTERN INDIANA.—This company has awarded a contract to the E. W. Sproule Company, Chicago, for the reconstruction of Dearborn Station, Chicago, which was recently damaged by fire.

CHICAGO, BURLINGTON & QUINCY.—This company is considering plans for the construction of a union station at Clinton, Iowa, to serve the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific and the Chicago, Milwaukee & St. Paul. The structure is expected to cost approximately $40,000.

CHICAGO, MILWAUKEE AND ST. PAUL.—This company contemplates terminal improvements at Sioux Falls, South Dakota, including increased trackage and alterations to freight and passenger stations.

CHICAGO, ROCK ISLAND AND PACIFIC.—This company is surveying a new line from Waurika, Oklahoma, to Healdton, a distance of approximately 15 miles.

EASTERN MAINE.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a new line from Houlton to Bancroft, Maine, 31 miles, with a branch of 3 miles to the Canadian border, and also for authority to issue $2,000,000 of capital stock.

ILLINOIS CENTRAL.—This company is receiving bids for the laying of 38 miles of second track from Central City, Ky., to Dawson Springs, which will follow a new route for a short distance. The construction of yards and terminal buildings at Central City is included in the project, which is estimated to cost approximately $3,000,000. This company closed bids December 28 for the construction of wash room facilities at Memphis, Tenn., consisting of a two-story brick building to cost approximately $60,000. The company will close bids on January 3 for the construction of a gravel washing plant at Freeport, Ill., to have a capacity of 2,000 cu. yd. per day.

ILLINOIS CENTRAL.—This company, which was reported in the *Railway Age* of December 23 as contemplating the construction of a single track line from Edgewood, Ill., to Fulton, Ky., approximately 175 miles, has completed plans for this work. The maximum grade will be 0.3 per cent. There will be no large bridges but there will be one tunnel, one mile long, in the Ozark Mountains of Southern Illinois. The line from Edgewood, Ill., to Akin and from Fulton, Ky., to Metropolis, Ill., will be constructed first. The total cost of the work will be approximately $13,000,000.

KANSAS CITY TERMINAL.—This company plans the construction, jointly with the city of Kansas City, of a viaduct near Chestnut and Guinotte avenues, Kansas City, Mo., approximately 1,500 feet long, crossing the tracks of the Chicago & Alton, the Missouri Pacific, the Kansas City Terminal and part of Guinotte avenue.

LOUISVILLE & NASHVILLE.—This company has awarded a contract to the Missouri Valley Bridge & Iron Company, Leavenworth, Kan., for the construction of piers for a bridge at Rigolets, La. This company has begun with company forces the construction of 15 miles of second track on its Cumberland Valley division between Bailey, Ky., and Walls End.

NEW YORK CENTRAL.—This company contemplates the construction, jointly with the city of Cleveland, of a new bridge in that city; estimated cost approximately $100,000.

PENNSYLVANIA.—This company has awarded a contract to the H. E. Culbertson Company, Cleveland, O., for the construction of trestle work in connection with the elevation of its tracks through the city of Cleveland.

SOUTHERN PACIFIC.—This company plans the construction of a bridge across the Colorado river at Yuma, Ariz., in a new location to cost approximately $2,000,000.

ST. LOUIS-SAN FRANCISCO.—This company, which was reported in the *Railway Age* of December 16 as having closed bids for the construction of a round house at Muskogee, Okla., has awarded the contract for this structure to C. E. Hamilton of St. Louis. Mo.

ST. LOUIS-SAN FRANCISCO.—This company is contemplating the construction of a new line from Sipsey, Ala., to Arkadelphia.

ST. LOUIS-SAN FRANCISCO.—This company contemplates the construction of a new freight house at Fayetteville, Ark. It is also considering remodeling the present passenger station.

WABASH.—This company contemplates the construction of a locomotive repair and machine shop at Decatur, Ill.

Kadel & Herbert

Christmas Trees Being Taken from Railway Piers at New York

Railway Financial News

CAROLINA, CLINCHFIELD & OHIO.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of $9,500,000 of first and consolidated mortgage 6 per cent bonds to be sold at not less than 91½, the proceeds to be used in paying off loans aggregating $8,000,000 from the government and in reimbursement for expenditures amounting to $1,500,000.

CHESAPEAKE & OHIO.—*Guaranty Certified.*—The Interstate Commerce Commission has issued a certificate placing the amount of this company's guaranty for the six months' period of 1920 at $4,378,841, of which $1,078,841 is still to be paid.

CHESAPEAKE & OHIO.—*Option on Stock Extended.*—The Wall Street Journal says:

The Van Sweringen interests will acquire the Huntingdon holdings of Chesapeake & Ohio common stock at $80 a share, if their recently acquired option is exercised according to bankers close to the Cleveland railroad operators. As the option is understood to cover about 30 per cent of the outstanding stock of the road, the total amount involved will be about $16,000,000. The road has outstanding common stock of a par value of $62,792,600. Apparently the Van Sweringens are having some difficulty in finding the cash to finance this transaction. It was learned that their option, which originally expired on January 1, 1923, has been extended for two weeks to give the intending purchasers time to complete their arrangements.

CHICAGO, ROCK ISLAND & GULF.—*Guaranty Certified.*—The Interstate Commerce Commission has issued a final certificate placing the amount of this company's guaranty for the six months period of 1920 at $273,076.

CHICAGO WAREHOUSE & TERMINAL COMPANY.—*Asks Authority to Issue Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue $150,000 of 5 per cent notes to be sold to the Chicago, Burlington & Quincy, the proceeds to be used in the construction of new tunnel and elevator shafts necessitated by the removal of the Burlington freight station facilities in Chicago to a point immediately south of the present location.

DETROIT & MACKINAC.—*Authorized to Sell Bonds.*—The Interstate Commerce Commission has authorized this company to sell $450,000 of first lien bonds at not less than 80.

INTERNATIONAL-GREAT NORTHERN.—*To Offer Bonds.*—This company will offer $13,462,000 6 per cent bonds on January 3 through a syndicate composed of Speyer & Co. and J. & W. Seligman & Co. They mature in 30 years and are secured by a direct first lien on the 1,159 miles of track, of which 1,106 miles are owned in fee. The total issue is of $20,000,000, of which $3,788,000 were exchanged for first mortgage bonds of the old company taken over in the reorganization and $2,750,000 were pledged with the director general of railroads as collateral for a 6 per cent loan of $2,400,000 due March 1, 1930.

KENTWOOD & EASTERN.—*Authorized to Abandon Line.*—The Interstate Commerce Commission has issued a certificate authorizing the abandonment as to interstate commerce of this company's line from Kentwood to Scanlon, La., 16.53 miles.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—*Equipment Trusts Sold.*—Dillon, Read & Co. and the National City Company have purchased $2,360,000 5 per cent equipment trust certificates, series K, issued under the Philadelphia plan. All the certificates have been sold privately at prices to yield from 5 to 5.20 per cent.

NIAGARA JUNCTION.—*Authorized to Issue Stock.*—The Interstate Commerce Commission has authorized this company to issue 10,000 shares of capital stock without par value in place of 1,345 shares of preferred stock and 1,600 shares of common.

PENNSYLVANIA COMPANY.—*Extra Dividend.*—This company, the capital stock of which is owned by the Pennsylvania Railroad Company, has declared its usual semi-annual dividend of 3 per cent and an extra dividend of 20 per cent, payable out of its accumulated surplus on December 30, to stockholders of record December 27.

The extra dividend is a further step in liquidating the Pennsylvania Company, which has been in progress since 1917 when it relinquished the operation as lessee of the various lines in the Pennsylvania System West of Pittsburgh, which obligations were assumed by the Pennsylvania Railroad Company.

VIRGINIAN.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $2,074,000 of first mortgage 5 per cent, 50-year gold bonds to be sold at not less than 95 to reimburse the treasury for expenditures for additions and betterments.

Dividends Declared

Louisville & Nashville.—3½ per cent, semi-annually, payable February 10 to holders of record January 15.

Northern Pacific.—1¾ per cent, quarterly, payable February 1 to holders of record December 29.

Reading Company.—Common, 2 per cent, payable February 8 to holders of record January 16; 2nd preferred, 1 per cent, quarterly, payable January 11 to holders of record December 29.

Trend of Railway Stock and Bond Prices

	Dec. 26	Last Week	Last Year
Average price of 20 representative railway stocks	64.88	63.83	56.30
Average price of 20 representative railway bonds	85.02	85.10	80.31

Maroggia Bridge, St. Gotthard Railway, Switzerland

Railway Officers

Executive

W. S. Andrews has been appointed assistant vice-president of the Southern.

E. Fox, general traffic manager of the El Paso & Southwestern, with headquarters at El Paso, Tex., has been promoted to vice-president in charge of traffic, with the same headquarters.

C. E. Spens will conclude his work as federal fuel distributor on December 31 and return to his duties as vice-president in charge of traffic of the Chicago, Burlington & Quincy, with headquarters at Chicago, from which he has been on leave of absence.

Traffic

E. H. Potter has been appointed general agent, freight department, of the New York Central, with headquarters at South Bend, Ind.

G. Byrne has been appointed general agent of the Cleveland, Cincinnati, Chicago & St. Louis and the Evansville, Indianapolis & Terre Haute, with headquarters at Terre Haute, Ind., succeeding A. T. Kingsley, who has resigned to take up other work.

F. N. Westerman, assistant general passenger agent of the Southern, with headquarters at Cincinnati, Ohio, has been transferred to Washington, D. C., in the same capacity. **E. G. Irwin,** chief clerk in the passenger department at Cincinnati, has been promoted to assistant general passenger agent, with the same headquarters, succeeding Mr. Westerman.

C. S. Morse, district freight agent for the Canadian Pacific, with headquarters at Toronto, Ont., has been transferred to Ottawa, Ont., in the same capacity, succeeding **F. P. Tucker,** who has been transferred to Detroit, Mich. **G. C. Cochlan,** district freight agent, with headquarters at Detroit, Mich., has been transferred to Toronto, Ont., succeeding Mr. Morse.

W. J. Tremaine, assistant general freight agent of the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific, with headquarters at Vicksburg, Miss., has been transferred to New Orleans, La., succeeding H. J. Niemann whose promotion to general freight agent was reported in the *Railway Age* November 18. **J. F. Hardin** has been promoted to assistant general freight agent with headquarters at Vicksburg, Miss., succeeding Mr. Tremaine.

W. C. Barnes, freight traffic manager of the El Paso & Southwestern, with headquarters at El Paso, Tex., has been promoted to traffic manager, with the same headquarters. **G. King,** general passenger agent, with headquarters at El Paso, Tex., has been promoted to assistant traffic manager, with headquarters at San Francisco, Cal. **W. S. Dawson,** assistant general freight agent, with headquarters at El Paso, Tex., has been promoted to general freight agent, with the same headquarters. **J. D. Mason** has been promoted to general passenger agent, with headquarters at El Paso, Tex., succeeding Mr. King. **H. D. McGregor** has been promoted to assistant general passenger agent, with headquarters at El Paso, Tex. **C. F. Arnold** has been appointed general agent, with headquarters at San Francisco, Cal.

A. Cotsworth, Jr., assistant general passenger agent of the Chicago, Burlington & Quincy, with headquarters at Chicago, Ill., has been promoted to general passenger agent, with headquarters at Omaha, Neb., succeeding **L. W. Wakeley,** who has been transferred to Chicago as assistant to the passenger traffic manager. Mr. Cotsworth was born on March 18, 1882, at Burlington, Iowa. He entered railway service in February, 1900, as an office boy in the general passenger department of the Chicago, Burlington & Quincy at Chicago, Ill. During the next six years he served in various clerical positions in the same department, and on February 1, 1906, was promoted to chief clerk in the department. He was promoted to assistant general passenger agent on March 1, 1920, and held this position until the time of his recent promotion to general passenger agent, as noted above.

Harvey Allen, whose promotion to assistant general freight agent of the Missouri, Kansas & Texas, with headquarters at St. Louis, Mo., was reported in the *Railway Age* of December 9, was born on February 28, 1889, at Evansville, Ind. He attended Staunton Military Academy at Staunton, Va., and Washington and Lee University at Lexington, Va., until November 12, 1907, when he entered the service of the Missouri, Kansas & Texas as a clerk in the local freight office at St. Louis, Mo. He was transferred to the claim department in February, 1909, and was promoted to rate and tariff clerk in June, 1910. He served in various capacities in this department until he was promoted to clerk to the assistant general freight agent at St. Louis, Mo., in October, 1916, and held this position until October, 1919, except for a period of 15 months when he was in the engineering corps of the army. In October, 1919, he re-entered railway service as chief clerk in the general freight office of the Missouri, Kansas & Texas at Dallas, Tex., and held this position until he was promoted to division freight agent at Oklahoma City, Okla., in July, 1920. He was serving in this capacity when he was promoted to assistant general freight agent in December, 1922.

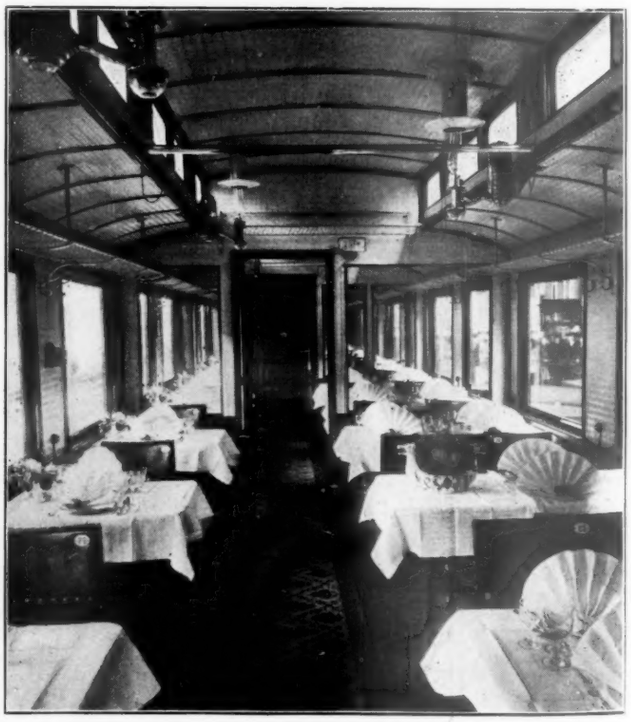
Mechanical

C. E. McCloskey has been appointed master mechanic of the Gulf Coast Lines, with headquarters at Kingsville, Tex.

Obituary

W. W. McCauley, assistant general superintendent of transportation on the Northern Pacific, died at St. Paul, Minn., on December 25.

Alexander Hilton, vice-president in charge of traffic of the St. Louis-San Francisco, died at St. Louis, Mo., on December 25, following a nervous breakdown.



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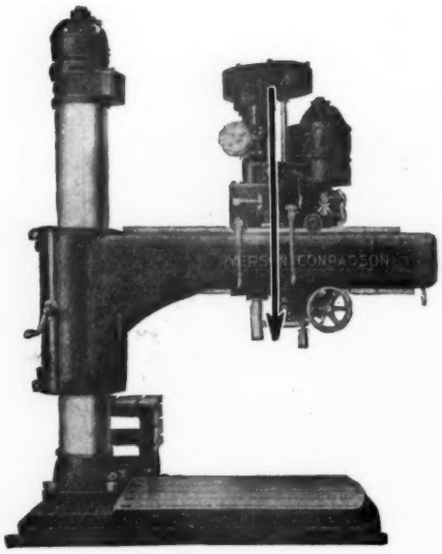

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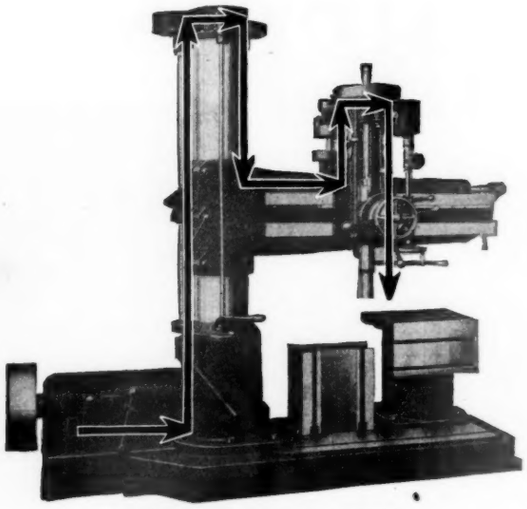
power flows in one direction



STANDARD RADIAL DRIVE
power changes direction 7 times

New Locomotives Create A Maintenance Problem

NOW that the higher capacity, more economical locomotive has arrived, railroad men are concerned with its maintenance.

In the Ryerson-Conradson twin motor radial, they have found a machine equal to the emergency. In the Round-the-Corner drive of the standard radials, power changes direction seven times between the motor and the spindle. On the R-C Straight line drive, power flows in but *one* direction. (Note the arrows.)

In the R-C Spindle Drive, four shafts and sixteen gears replace the thirteen shafts and thirty-three gears of other standard types.

This elimination of nine shafts and seventeen gears saves a large percentage of power which on other drives is lost through friction of many moving parts.

Friction means wear; wear means breakdowns, repairs and replacement; and breakdowns, repairs and replacements cost money and delay the return of much-needed power to the road.

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Railway Age

Vol. 73 December 30, 1922 No. 27

Erecting American 30-Ton Cars at Danzig

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Published every Saturday and daily eight times in June by the

Simmons-Boardman Publishing Company, Woolworth Building, New York

EDWARD A. SIMMONS, *President* HENRY LEE, *Vice Pres. & Treas.* C. R. MILLS, *Vice-Pres.*
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CHICAGO: Transportation Building CLEVELAND: 4300 Euclid Ave. LONDON, England: 34, Victoria St., Westminster, S. W. I. Cable address: Urasigmec, London
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Entered at the Post Office at New York, N. Y., as mail matter of the second class.

Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free: United States, Mexico and Canada, $6.00. Foreign countries, including daily editions published in March and June, $10.00. Foreign countries, not including daily editions, $8.00. Foreign subscriptions may be paid through our London office in £ s. d. Single copies, 25 cents each.

WE GUARANTEE, that of this issue, 9,100 copies were printed; that of those 9,100 copies, 8,099 were mailed to regular paid subscribers; 68 were provided for counter and news company sales, 308 were mailed to advertisers; 77 were mailed to employees and correspondents, and 548 were provided for new subscriptions, samples, copies lost in the mail and office use; that the total copies printed this year to date were 471,170, an average of 9,061 copies a week.

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An Automatic Train Control System that provides safety, and with it, maximum capacity.

It combines those essential features necessary to successful operation.

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(2) It compels acknowledgment by the engineman of restricting signals.

(3) It insures safe speed approaching a stop signal.

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The rust tax

ALL taxes cut into gross earnings, and by no means the least of these is the rust tax.

This is the tax, amounting to millions of dollars each year, paid out by the railroads of the country to replace the enormous tonnage of iron and steel eaten away by rust.

There is, however, one essential difference between the rust tax and other taxes. Much of the rust tax can be eliminated.

Simply by using a pure, rust-resisting iron wherever possible in its equipment, a railroad can reduce its rust tax materially.

That's why for locomotive jackets, boiler tubes, cars, tanks, fences, culverts, and hundreds of other items, many railroads are using "Armco" Ingot Iron.

"Armco" Ingot Iron resists rust because it is a commercially pure iron. In fact, it is the purest iron manufactured in commercial quantities. Gauge for gauge and finish for finish, it outlasts steel under the same conditions.

If you will write us, mentioning the equipment which you contemplate ordering, we shall be glad to tell you where "Armco" Ingot Iron should be used.

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ARMCO

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Resists Rust

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Will the system do this, that or the other, and what will be the effect of such and such a set of conditions?

It requires time even to *think* of the number of conditions which must be fulfilled by a system upon which the safety and expedition of railway operation are dependent.

The Miller Train Control has been meeting all the conditions of everyday railroading over an entire division of a busy road for eight years.

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Pair of Stationary Jacks (bolted to foundation).

1524

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1525

2326

End view of Four-Jack Locomotive Hoist showing lifting beam lowered into slot in foundation; hauling winch in foreground. Lehigh Valley R. R., Lehighton, Pa. This company is using six Whiting Hoists

—7 Hours More on the Road

Many roads curtail engine service through lack of proper wheeling facilities. By the use of a

Whiting Screw-Jack (Patented)*

LOCOMOTIVE HOIST

it is easily possible to save an average of 7 hours per locomotive on the unwheeling and re-wheeling operations, not counting a saving in repair shop labor of from $14,000 to $36,000 per year. All the big roads use and endorse the Whiting Hoist.

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Los Angeles & Salt Lake	2	Lehigh & New England	1
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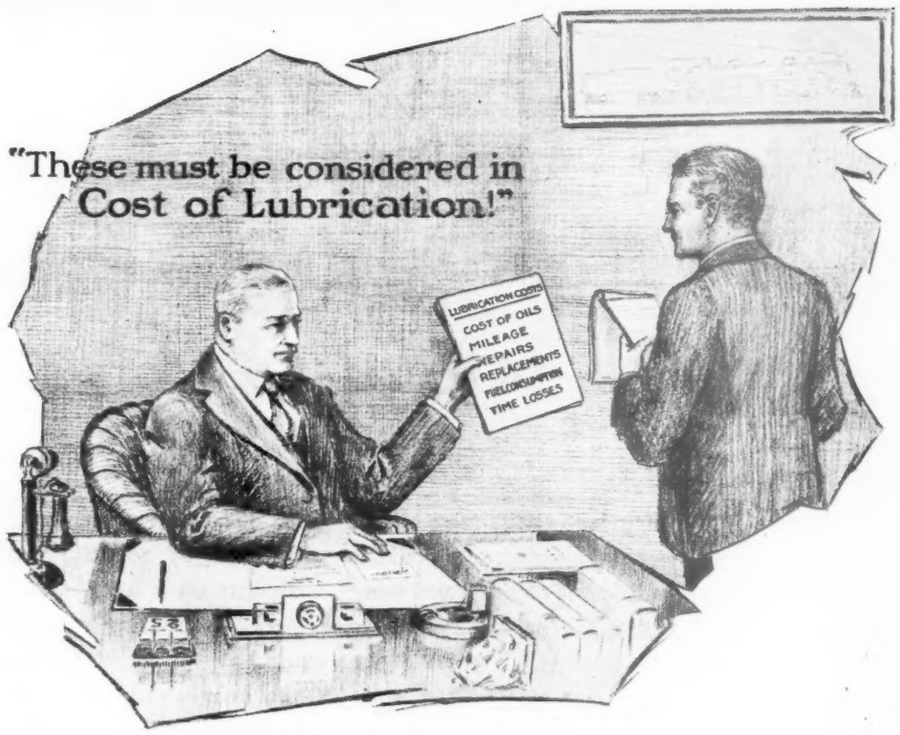

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One of the largest and most representative railroads in the United States, wishing to get actual facts on the lubrication question, devoted a full year's service test to lubricants claiming to be "good as Galena."

A check was kept, not only on the cost of the oils, but on the class of service rendered by them——on the number of hot boxes and driving journals, on locomotive performance, fuel consumption, repairs and general condition of the bearing parts of equipment.

At the conclusion of the most thorough and impartial tests these lubricants were discontinued entirely and Galena Lubrication recommended and adopted as being much more efficient in service and considerably lower in cost, through its proven ability to maintain equipment in first class running order and practically eliminate the enormous expenses in time, labor and repair that had grown to large proportions with the materials under test.

The assertion "good as Galena" is easy to make but hard to substantiate. Service is the unfailing test of ability.

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What are you thinking of when you buy bolts and nuts—the price or the cost?

THE price is the figure on the purchase order. The cost is the sum of that amount and what you must invest afterward to make use of the stuff you bought.

It is surprising how many purchasing agents accept bad bolts and nuts as something inevitable, usual, and customary.

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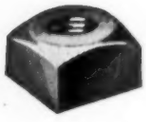
It is more surprising to find that some of them have never considered that every one of these defectives added to the price on the order sheet, that sum of money paid to labor wasted in trying to use that faulty nut.



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RAILROAD·LUBRICATION

Goodbye 1922

1922 is just about to leave us—with its records of achievements and failures, and, looking back, there will be few who do not agree that it was a pretty good year after all.

The list of Texaco customers has grown remarkably during the year, and old customers have appreciated more than ever the lubrication service rendered by Texaco.

To the roads in whose prosperity we have shared—and to which we have contributed by furnishing better lubrication, we wish a Prosperous New Year.

To the roads who do not know Texaco Lubrication we wish a Prosperous New Year, with the suggestion that during the New Year they see for themselves what better lubrication means in railroad operation.

Texaco Extends Heartiest New Year Greetings to Every Railroad Official and Employee

THE TEXAS COMPANY
RAILWAY TRAFFIC & SALES DEPARTMENT
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Insure greater safety at high speeds

Use alloy steels to lighten the weight of parts. This saving lessens cost of repairs to equipment and track. It increases the power per unit of weight.

Recently, in designing heavy locomotives, a saving of 500 pounds per engine was made by using U-LOY Steels for the reciprocating and revolving parts. Reduced to the terms of Dynamic Augment, these locomotives are no more severe on track at 40 miles per hour than the same class (ordinary built) engine traveling 32.6 miles per hour.

Weights of engines can be lessened even more by using U-LOY Steels for axles, guides, valve gears, equalizers, draw bars, bolts, springs, pins, etc. Forgings of U-LOY Steel can be made in your own shop,—no specially trained organization required. Write for detailed information.

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Open Hearth and Electric Furnace U-LOY Steels are furnished in:—

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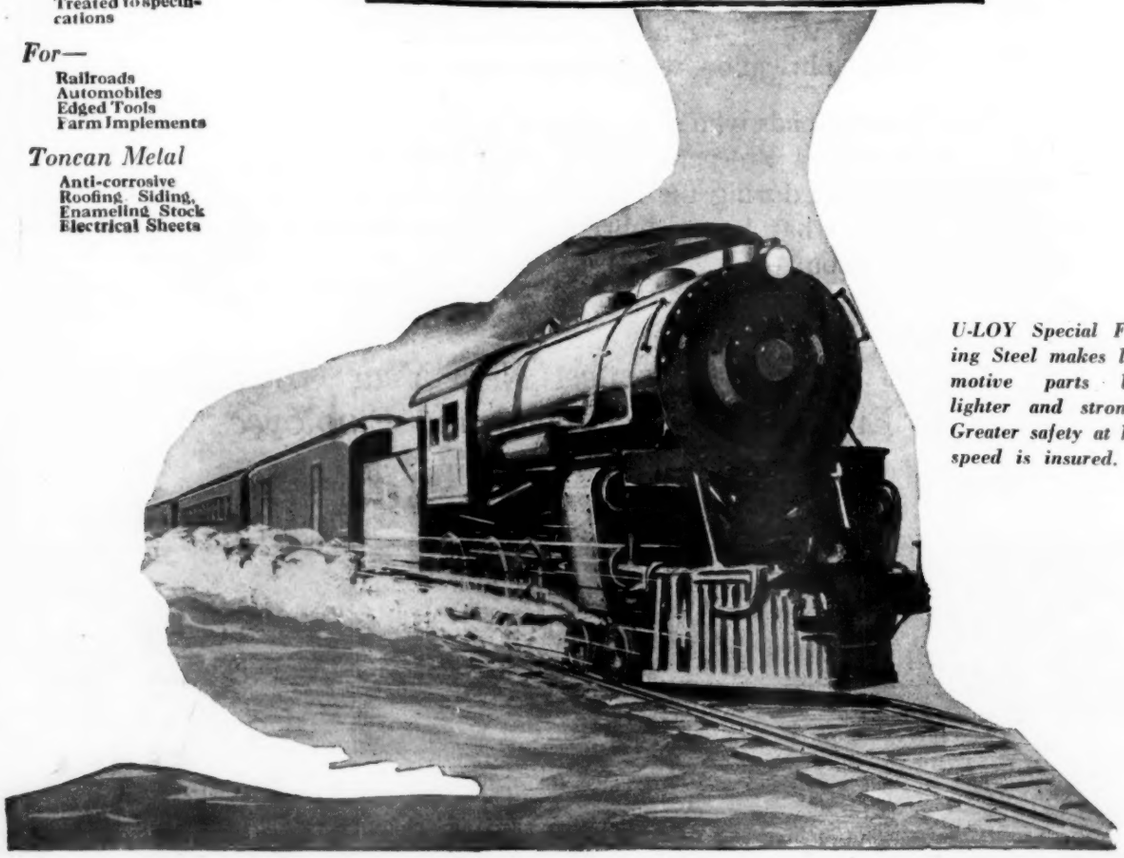

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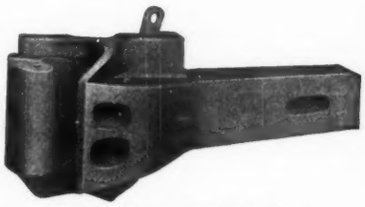
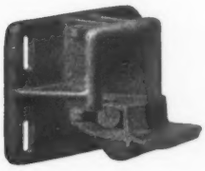
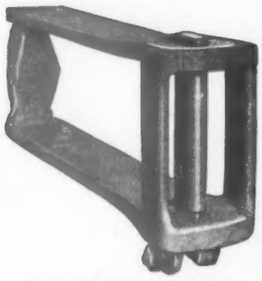


A. R. A. Type "D" Couplers



Simplex Adjustable Coupler Pockets



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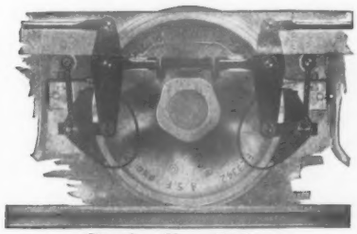

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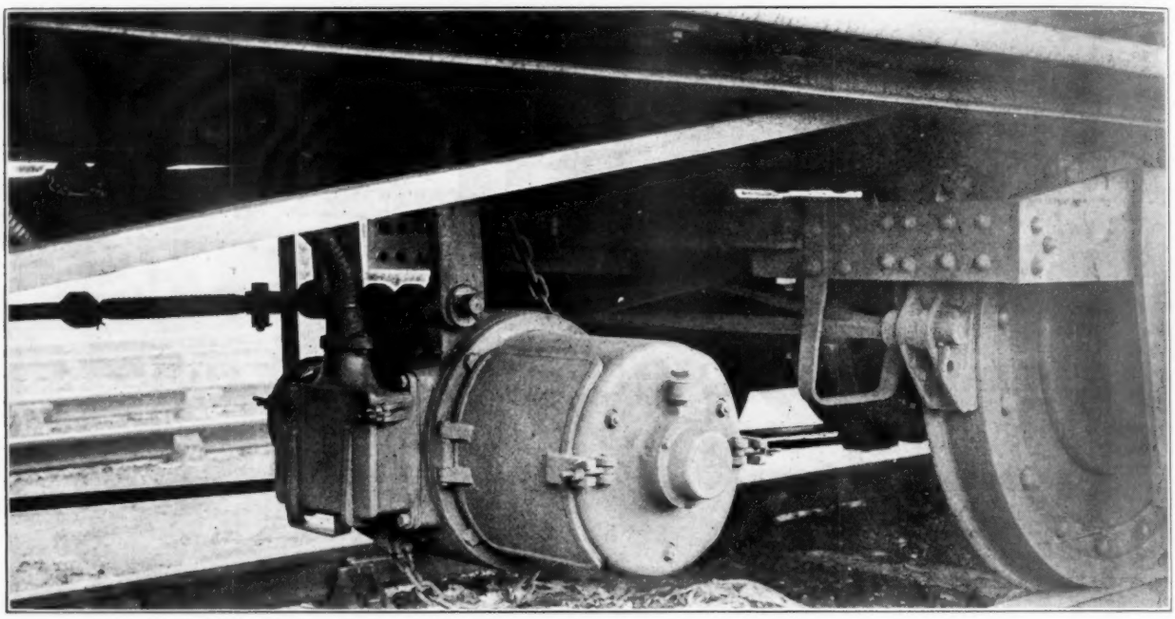

Protect this metal—with red-lead

Here's a dynamo suspended from a coach body. With the other metal underneath the car, it is partially concealed from view. There is every chance for rust and corrosion to attack these parts because of their position. A protective paint is absolutely essential.

Red-lead is especially necessary to use at contact points and on concealed and inaccessible surfaces. It should always be used for next-to-the-metal coat. It is desirable to use it for following coats.

Dutch Boy Red-Lead is widely used and is specified by the largest railroads in the country. Properly applied to a clean metal surface it holds fast and covers the metal with an even, elastic coat that time affects very slowly.

Dutch Boy Red-Lead is purest red-lead, highly oxidized and prepared in both paste and liquid form.

For contact surfaces and for priming coats the straight red-lead is used. For finishing coats the liquid red-lead comes tinted to light and dark brown, light and dark green, and black—usually preferred for railroad use.

Protect every inch of metal with Dutch Boy Red-Lead.

"Save the surface and you save all"—Paint & Varnish

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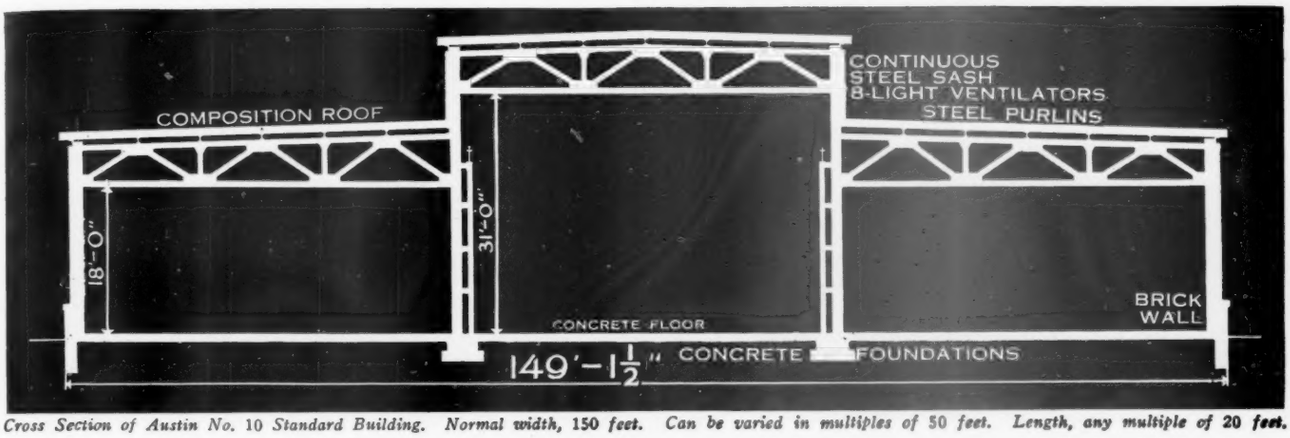
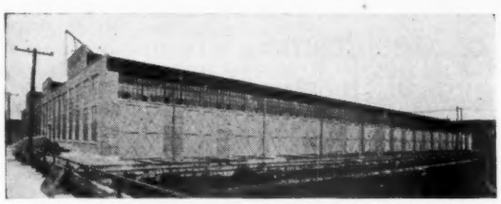
Dutch Boy Red-Lead



Cross Section of Austin No. 10 Standard Building. Normal width, 150 feet. Can be varied in multiples of 50 feet. Length, any multiple of 20 feet.



Exterior of the Standard Steel Car Company's car shop at Hammond, Ind., showing the old building and the new extension, both designed, built and equipped by The Austin Company.

Interior of Standard Steel Car Company's Shop at Hammond, Ind. (a repeat contract), designed, built and equipped by The Austin Company.

American Car & Foundry Co. Car Paint Shop, Chicago, Ill., designed, built and equipped by The Austin Company.

Standard Steel Car Co. Car Repair Shop. An Austin No. 10 Standard Building, the first of several contracts executed for this company at different points.

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You can have additional floor space quickly and take advantage of the present business situation. You can have an Austin Building ready for useful occupancy when you want it. It will be built on a definite time schedule basis.

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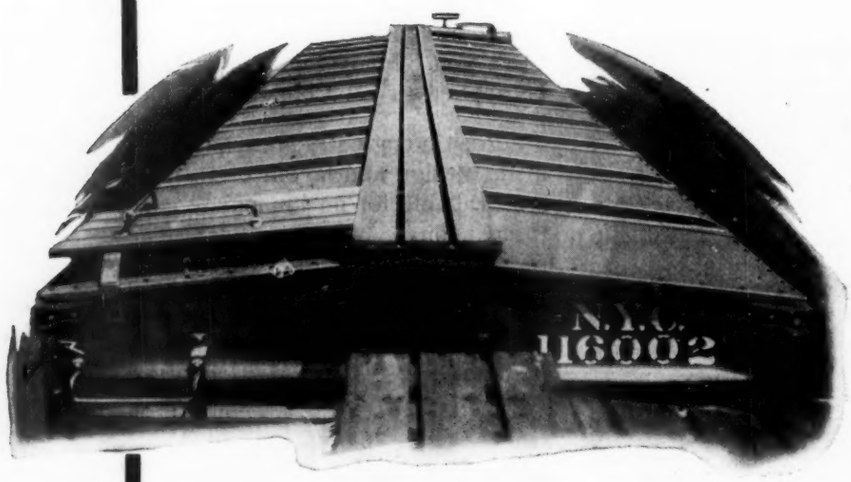

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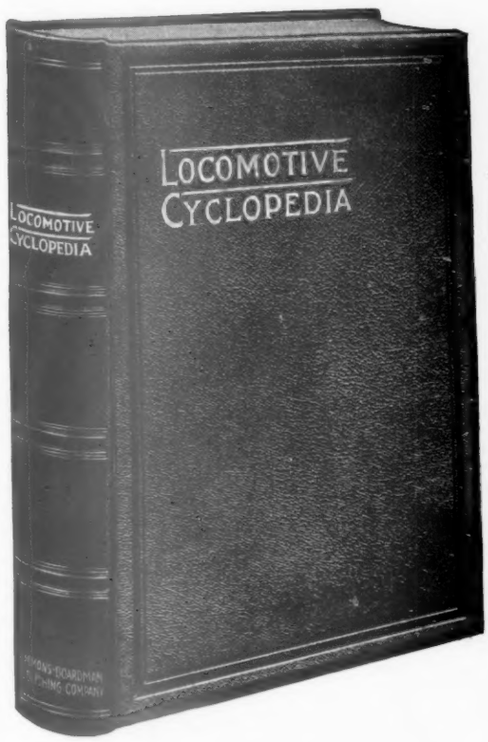
The Locomotive Cyclopedia



ACCURATE, up-to-the-minute information on locomotive design, construction and maintenance will be found in this Cyclopedia. The 1922-23 edition, with its new, easy-reference plan should receive a heartier welcome from Mechanical Department men than any of the previous issues. Under the new plan (which is also used in the "Car Builders' Cyclopedia") all related matter is grouped in one place—text, drawings, photos and detailed data furnished by various manufacturers. Edited by Roy V. Wright and Charles N. Winter under the supervision of a committee appointed by the American Railway Association—you can be sure that the information is practical, concise and complete.

Contents:

1 Definition and Index Section
2 Locomotive Section
3 Locomotive Details—Fireboxes, Boiler Fittings, etc., with A. R. A. Specifications
4 Tender Section, including Tender Tanks, Underframes, Draft Gear, Couplers, etc.
5 Electric Locomotive Section
6 Material Section, including specifications for materials used in Locomotive Construction
7 Industrial and Foreign Locomotive Section
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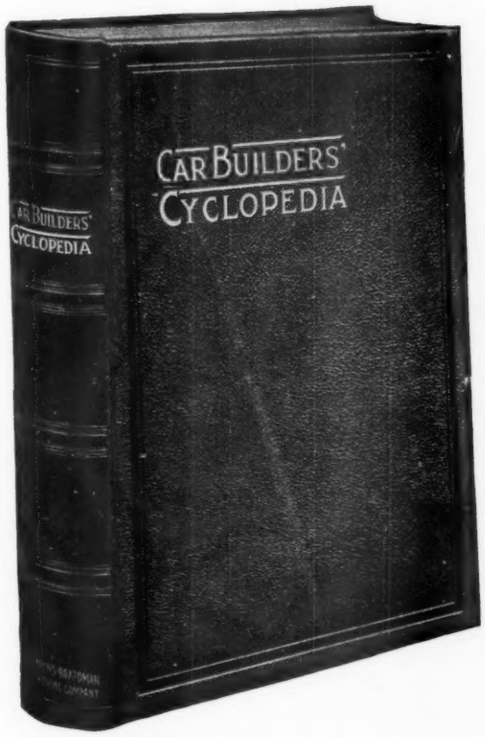

The Car Builders' Cyclopedia

BASED upon the same easy-reference plan as the "Locomotive Cyclopedia," the "Car Builders' Cyclopedia" gives you usable, up-to-date information on car design, construction and maintenance. Also edited by Roy V. Wright and Charles N. Winter, under the supervision of a committee appointed by the American Railway Association. You will find it packed full of practical data—available at a moment's notice. As both Cyclopedias have had an unusual advance sale and the editions are limited, it is advisable to order your copies as soon as possible. The coupon below is for your convenience.

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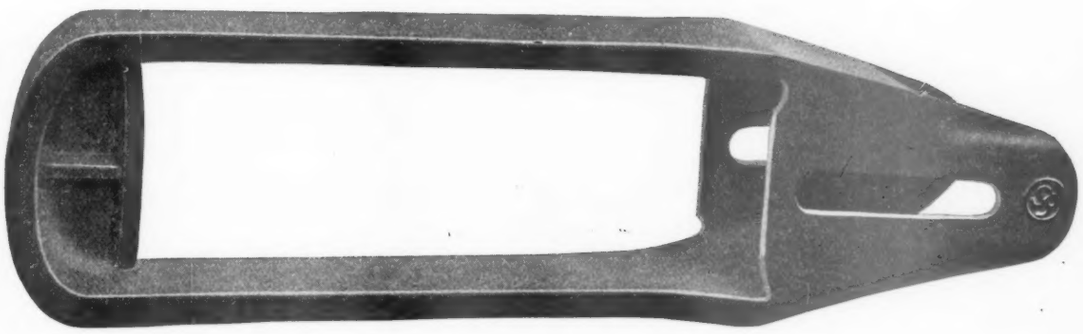

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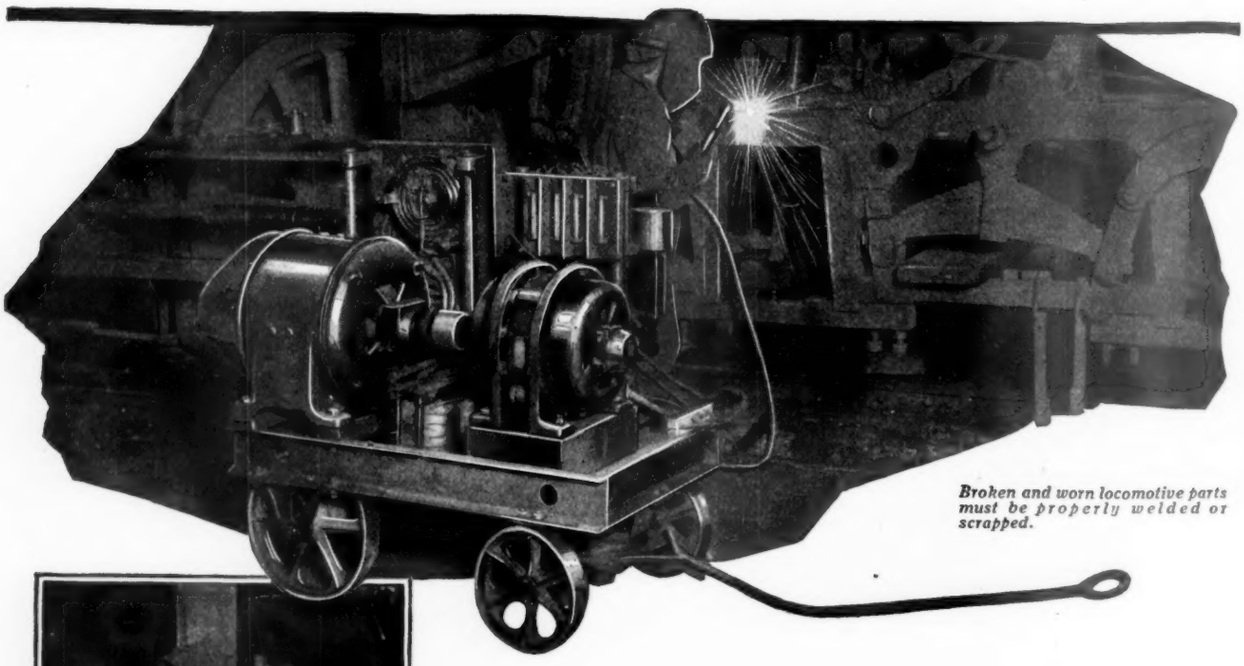
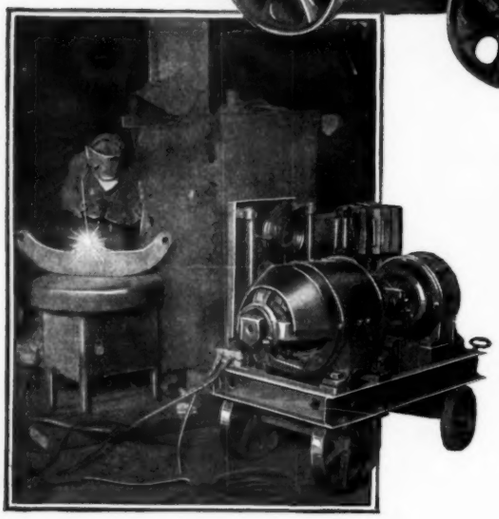
Electric arc welding reduces time and costs in making repairs and helps keep locomotives in revenue earning service



Broken and worn locomotive parts must be properly welded or scrapped.



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Engine frames, cylinders and like parts can be welded in place without shopping locomotive. Worn parts can be removed and built up and replaced in a short time, all being accomplished at a big reduction in maintenance expense.

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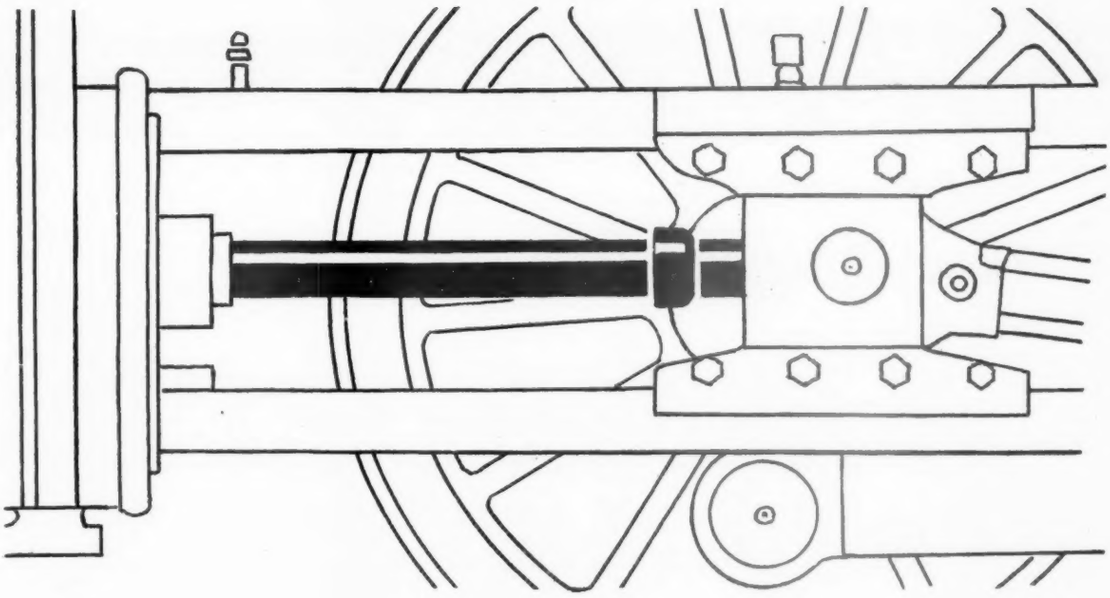

PISTON ROD

If a weak point exists in rods or other heavy-duty forgings, the piston thrusts or motor torque in time will find it. Find out how the manufacturer produces forgings—find out what materials and methods he employs—and you will then be able to determine probability of weakness in advance of purchase.

That is why all roads which analyze our methods place confidence in Standard Steel Works Forgings at a slightly higher first cost.

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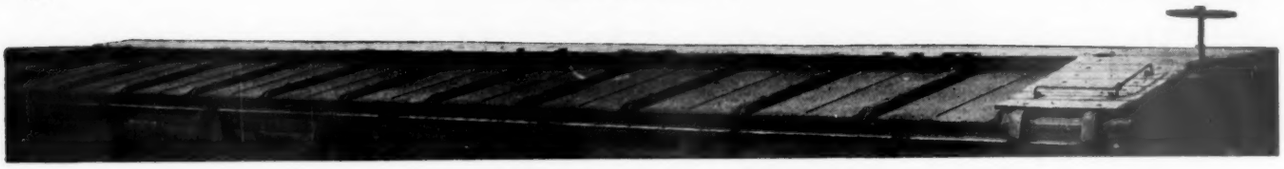

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"With the adoption of the all-steel roof, the question of flexibility becomes a very live subject. Some types provide for free movement of the roof sheets, in a similar manner to the flexible outside metal roof.

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provide for this flexibility and do not have the defects of the inside roofing boards to contend with, as in the case of the outside metal roof.

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LIFE'S true reward is the satisfaction of accomplishment and the hope of more to come. This desire is the inspiration of every real effort to benefit mankind.

It is the inspiration of every engineer, every inventor, every executive. This desire has given us our railroads, our locomotives, our cars—the best in the world.

It also has given us the better locomotive, meaning 40 to 50 percent. more ton-mile capacity. Does this mean a lot to the railroads right now? Can you afford to overlook it when ordering new power?

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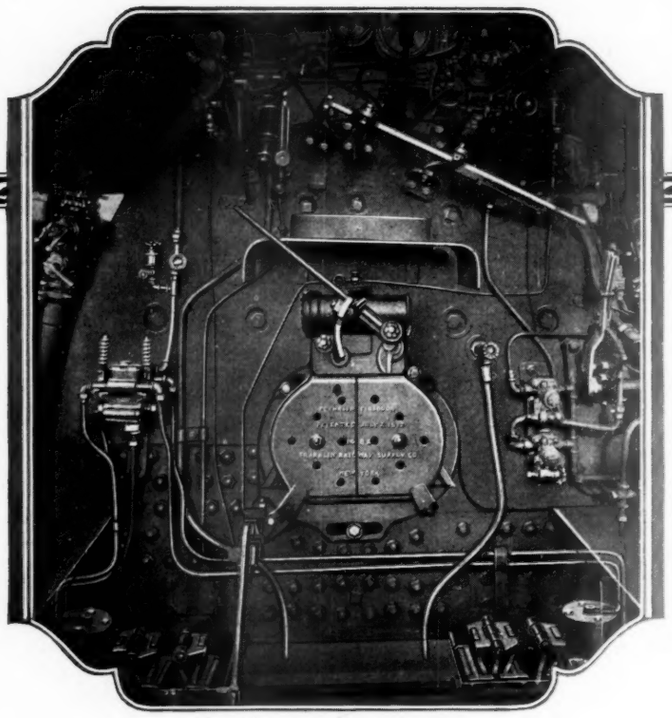

Franklin Automatic Firedoor
Butterfly Type

SHUT THE DOOR

NO ONE would build a locomotive and leave off the fire door.

Everyone knows that enough cold air will kill any engine.

To keep out steam-killing cold air is the purpose of the Franklin Automatic Fire Door.

With a good fireman, there's just enough time to get the scoop out and the firedoor is closed.

Franklin Firedoors make freer steaming engines and at the same time save coal.

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"On the Lehigh and New England Railroad"

Total Weight of Engine, 301,500 pounds; Weight on Driving Wheels, 279,000 pounds; Diameter of Driving Wheels, 61 inches; Boiler Pressure, 210 pounds; Cylinders, 27x32 inches; Maximum Tractive Power, 68,200 pounds.

Consolidated locomotive No. 301, one of several of this type recently delivered to the Lehigh & New England Railroad is the heaviest and most powerful consolidated locomotive ever built.

> "Two of these locomotives are assigned to a region where they are handling heavy coal trains a distance of fifty-four miles, encountering .5% grade, hauling 3500 tons at a speed of approximately twenty miles per hour.
>
> Their performance is highly satisfactory, negotiating all grades and curves with ease, steaming freely without excessive coal consumption. Two others, working out of Pen Argyl on a 2.75% grade, haul 690 gross tons with similar results."

The remarkable results obtained by these locomotives point with particular clearness to the efficiency of Alco engineering methods.

To retain consolidation arrangement but increase its power to the capacity usually only found in a widely different type was the objective.

Working in close co-ordination with the Mechanical Department of the railroad, Alco Engineers succeeded in enlarging the capacity of this type without departing from established methods of weight distribution or altering arrangement of consolidation design.

In this instance as in many others, a need was supplied—without supplying more than was needed.

Alco service has often demonstrated that there is a vast difference between—

getting all you need
and
needing all you get.

AMERICAN LOCOMOTIVE COMPANY

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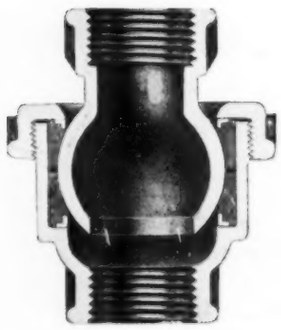
When Winter Comes



THEN is the time that the proper heating of coaches and Pullmans in station sidings, coach yards and terminals counts—counts big in securing the good will of the traveling public and in obtaining increased patronage for your road.

The rigor of the coldest winter weather will find your passenger cars warm and comfortable, if you use

BARCO
Station and Coach Yard Connections

Zero weather, snow, ice, or high pressure cannot hurt Barco All Metal Connections nor cause them to burst, leak or fail—while the Barco Universal Ball Joints always furnish a free and unobstructed passage for steam, regardless of the exact position of the car and without requiring accurate spotting of trains.

And think of the savings in hose renewals made possible by the use of Barco metallic connections. This item alone quickly pays for their installation.

Why not let us solve your terminal car heating problems? Complete information gladly furnished—write for it.

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11/23/22

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enjoyed by the people of these
United States, could not have
materialized without the loyal
and efficient cooperation of
the railroads during the past
year

J. L. Wanamaker

921

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making good on

A Resolution!

TEN years ago we resolved to build a locomotive stoker that would embody every quality shown by study and experience to be required in performing the tremendous task of firing *any* locomotive to full capacity—

Under all conditions which might arise in the course of a normal road trip;

Crushing its own coal as it went;

Distributing fuel in a manner to obtain the most efficient and scientific combustion;

Rugged enough to stand up under *years* of gruelling service;

Practical, economical, dependable, *satisfying*;

A stoker for which no job would be too big!

Our resolution culminated in the DUPLEX STOKER, and proof that we have successfully met every requirement laid down for perfect stoker performance is found in the fact that

5,000 of our Stokers are now in Service on 78 Railroads

—"*because the Promise has been performed*"

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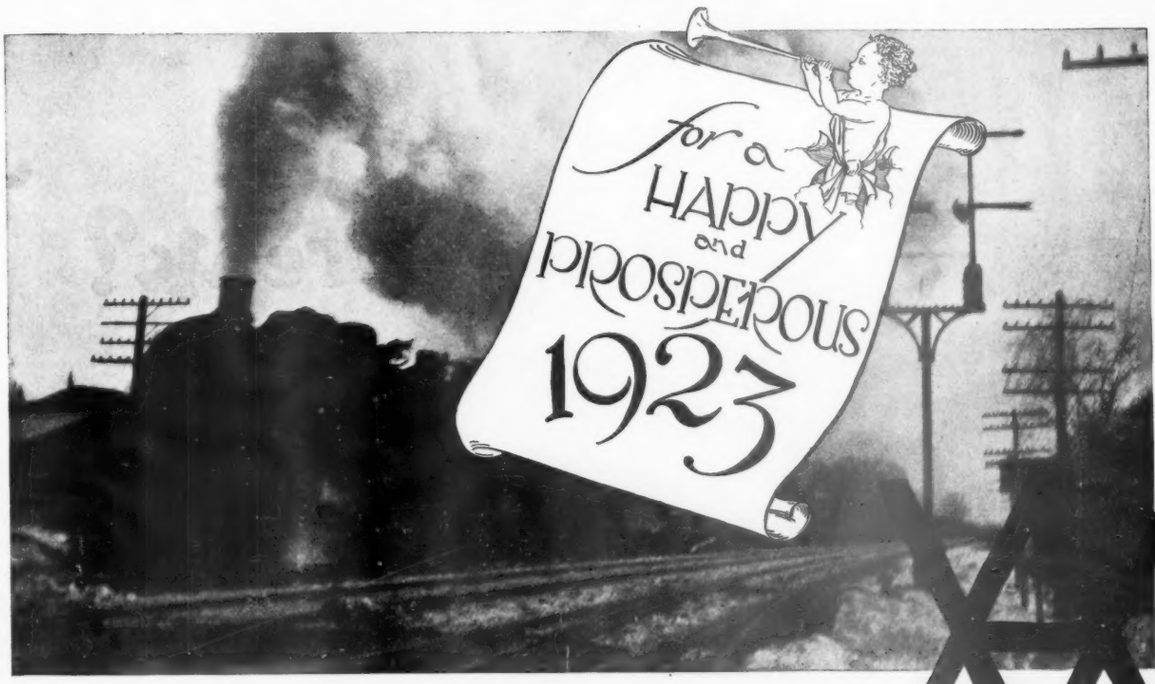


New Year Greetings

¶ To our friends the railroads, and our contemporaries in the railway supply field, we extend best wishes for the New Year.

¶ On the threshold of another twelve-month business cycle, we take pleasure in thus publicly renewing our pledge of 53 years' standing to give our customers and our friends in the future the same degree of loyal co-operation and unselfish service which it has been our constant endeavor to render in the past.

¶ May Nineteen Hundred and Twenty-Three hold a full measure of happiness and prosperity for us all.

A. L. Humphrey

PRESIDENT

WESTINGHOUSE AIR BRAKE CO.

General Office and Works, Wilmerding, Pa.

New York Washington Pittsburgh Chicago St. Louis San Francisco

What Makes It Break?

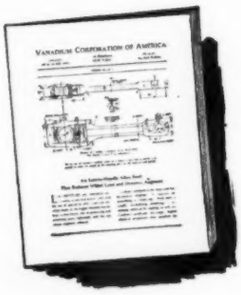
WHY do carbon steel running gear parts, seemingly sound and strong, fail in service?

The answer is simple.

Under repeated reversal of stresses, plain carbon steel becomes fatigued and eventually gives away. This gradual weakening of the steel cannot be prevented or even anticipated, for plain carbon steel lacks the strength and shock-resisting qualities which locomotive forgings must have.

Running gear parts should be made of tough, strong alloy steel of high anti-fatigue and shock-resisting qualities. Such a steel is Carbon-Vanadium, the simple alloy steel that meets every railroad requirement.

Carbon-Vanadium Steel is strong and tough. It is not quenched or tempered, merely Normalized*. It can be handled by any shop having ordinary annealing facilities.



Write for Bulletin LF 1 and other data on Carbon-Vanadium, the Normalized Forging Steel.

* NORMALIZED: means heated and allowed to cool slowly in still air.

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PARKESBURG TUBES

are REAL *Charcoal Iron Boiler Tubes*

A lower priced tube—not a cheaper one. A genuine charcoal iron tube, at a slightly higher price per foot, would have given longer and lower cost service.

Buying *for* Service

AN important railroad recently ordered forty locomotives at a total expenditure that would have purchased sixty locomotives of the same class, but less efficient.

Forty of these better locomotives will do more than sixty weaker ones. Forty locomotives require less maintenance than sixty.

A number of large roads buy boiler tubes on the same basis. They pay a little more per foot for genuine charcoal iron tubes because they know that charcoal iron tubes give longer service life with few replacements and less maintenance cost.

Locomotives or boiler tubes—it pays to pay a little more for a better article.

For corrosion-resisting charcoal iron tubes that last beyond the life of ordinary tubes, specify Parkesburg Charcoal Iron Boiler Tubes.

"For Every Locomotive," a little folder with an interesting story of the Charcoal Iron Boiler Tube, will be sent you on request. Write for a copy.

The Parkesburg Iron Company

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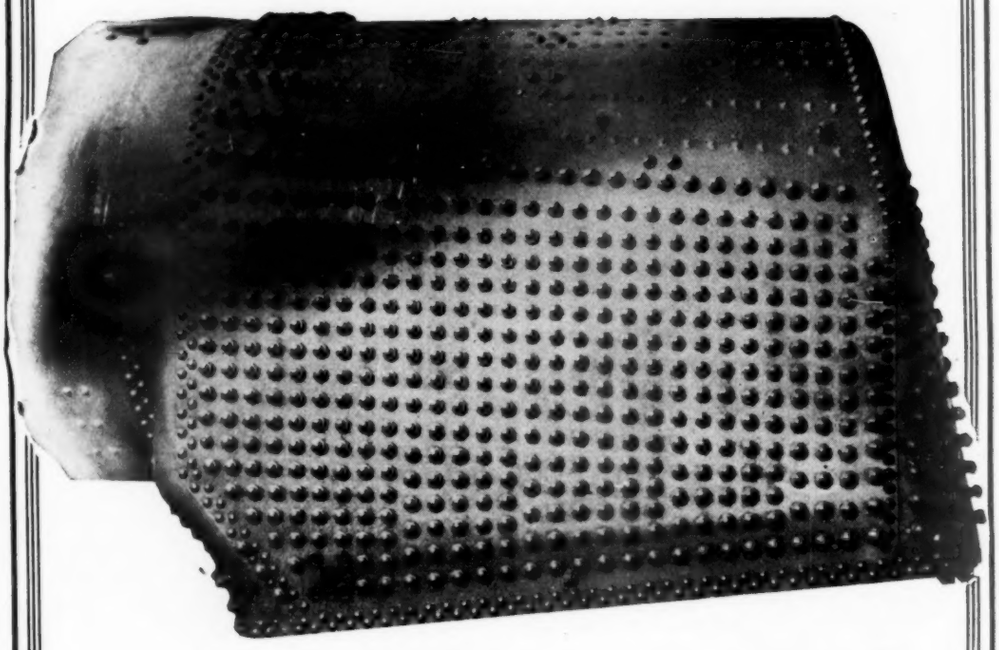
And There Are 150 More Like This Now Under Construction—



THE locomotive boiler shown above is completely equipped with FLANNERY FLEXIBLE STAYBOLTS and is one of 150 such boilers now being constructed and applied to 150 new engines of similar type.

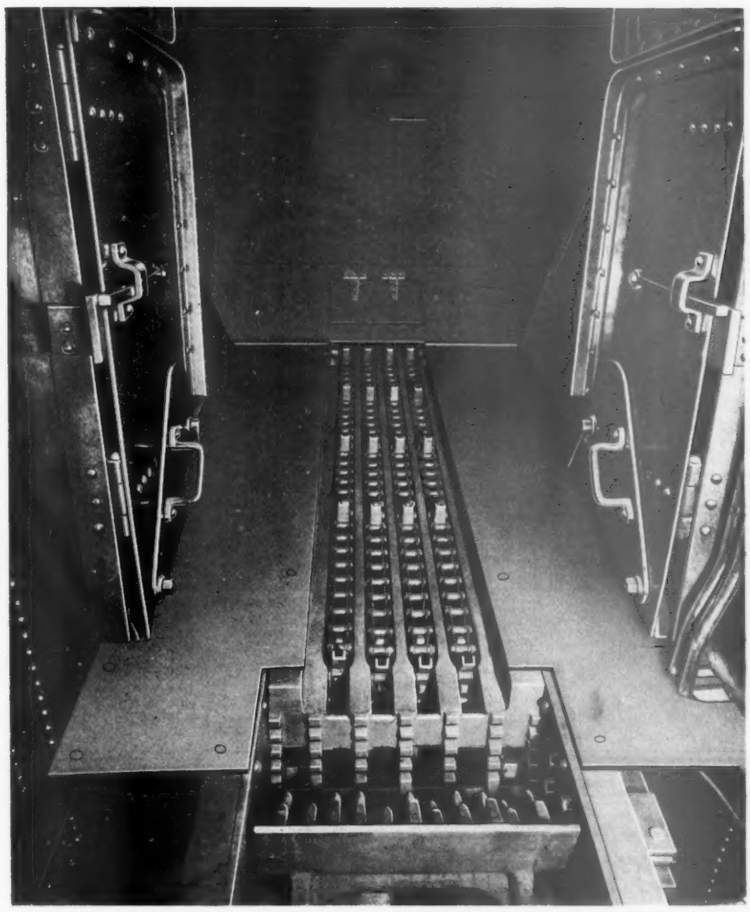
The remarkable savings in maintenance as well as the splendid all around service given by the first engine so equipped was responsible for the specification of F. B. C. Flexible Staybolts throughout when additional locomotives were required.

Your road, too, can share in this saving by specifying FLANNERY FLEXIBLE STAYBOLTS for all new power and repair work.

FLANNERY BOLT COMPANY

Vanadium Building

PITTSBURGH :: :. :: PENNA.



View looking into the tank of a locomotive equipped with an Elvin Mechanical Stoker, the front deck plate and cover over the coal breaker being removed to more clearly illustrate the operation.

Coal Crushing

Elvin Mechanical Stokers do not crush coal already small enough for stoker use. Such coal passes through slots direct to the conveyor. The Elvin breaker *breaks lumps* only and does it in plain view ahead of the coal gates, where foreign matter can be easily removed if necessary.

Approximately three Horse Power only is required to run the stoker and appurtenances under full load.

Elvin Mechanical Stokers fire less coal in a manner that secures more work from your locomotive—and *keep doing it!*

ELVIN MECHANICAL STOKER COMPANY
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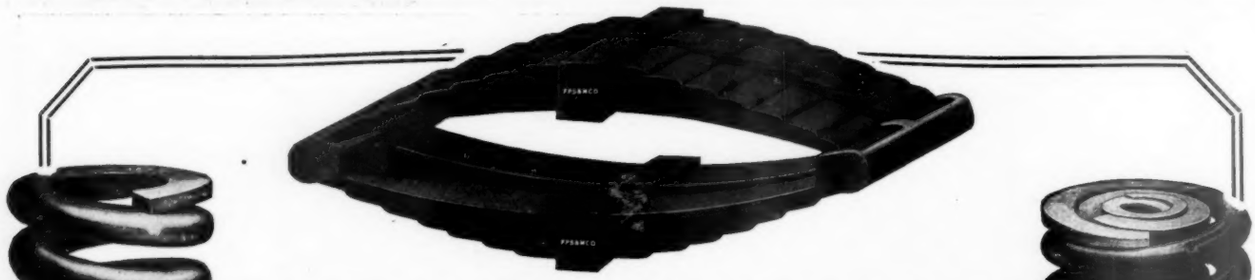

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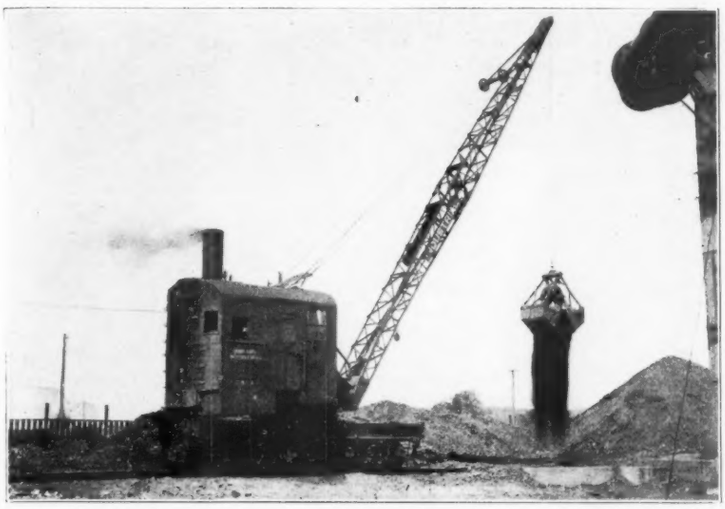

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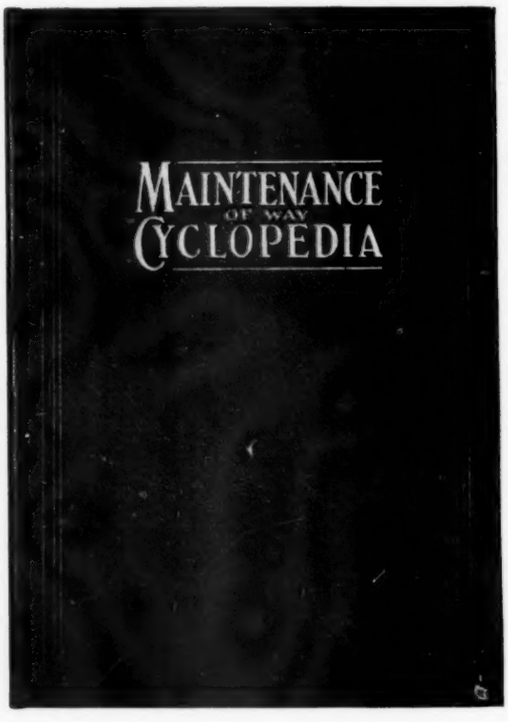

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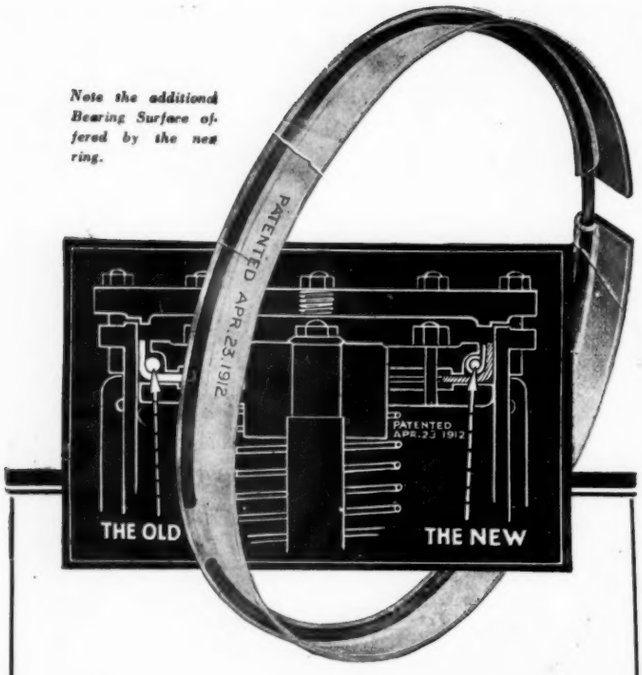

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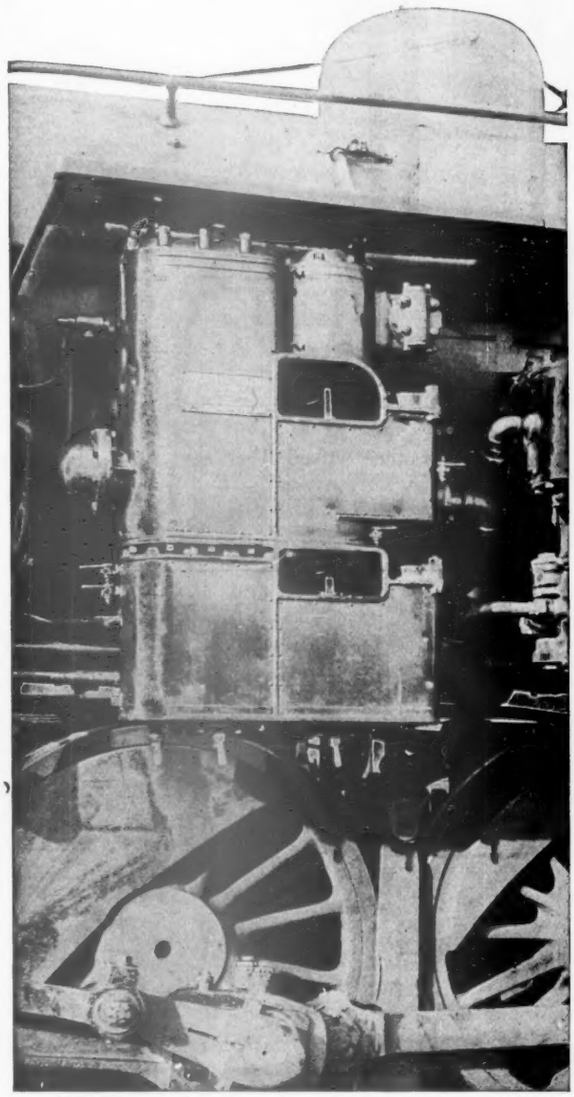

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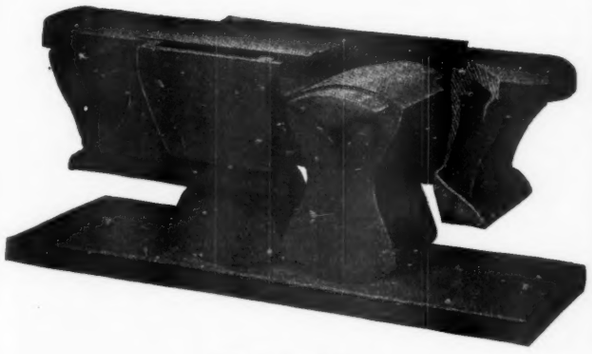

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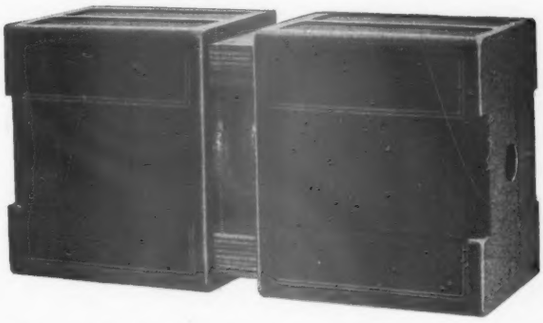

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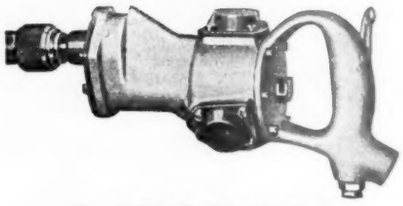

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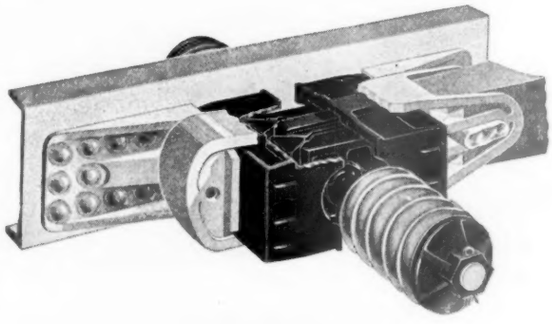

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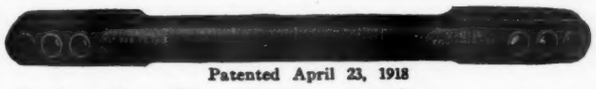

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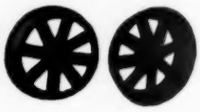
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Small cut nails—Tacks.

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See advertisement in issue of December 23, 1922, page 53

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FOR FREIGHT CARS
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Grain Doors—Car Material—Long Leaf Bridge Timbers
SPECIALISTS IN YELLOW PINE LUMBER
(See advertisement in issue of December 16, 1922, page 13)

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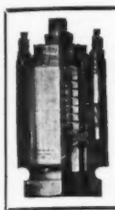
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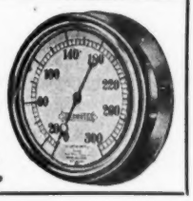

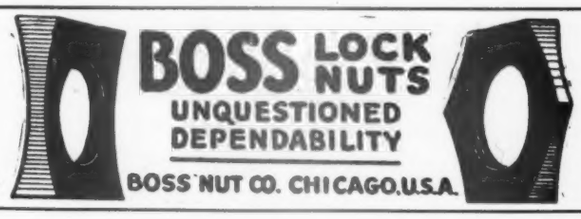

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Furnished in all standard sections

Effects great economy in maintenance on all curves for congested traffic
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PITTSBURGH DES MOINES TANKS
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PITTSBURGH
30 cu. yds. Level Full;
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100,000 pounds A. R. A. Capacity.
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Consulting Engineer
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Reinforcements of Long Spans a Specialty
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Industrial Plants, Buildings, Steam Power Plants, Water Powers, Gas Plants, Steam and Electric Railroads, Transmission Systems.
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CHEMICAL AND PHYSICAL TESTS
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M. C. B. Design
25% longer wear. Do not heat, burn or wear wheels. A trial order sent on request. Write us for quotations.
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Use the Professional Directory in order to keep your name before every important railway official.

Classified Advertisements—Help and Situation Wanted advertisements appearing in the "Get Together Department," 5c. a word an insertion, including ten words for address. Minimum charge $1.00 for each insertion. For Sale advertisements, $3.00 a column inch (1" deep x 15/8" wide.) Any number of inches may be used. Copy must be in this office by Saturday noon to insure insertion in the following week's issue.

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SALARIED positions $2,500 to $25,000 upward; executive, technical, administrative, engineering, manufacturing, professional, managing, financial, etc., all lines. If you are qualified, and receptive to tentative offers for a new connection, you are invited to communicate in strict confidence with the undersigned, who will conduct preliminary negotiations for such positions. A method is provided through which you may receive overtures in confidence, without jeopardizing present connections, and in a manner conforming strictly to professional ethics. Send name and address only; preliminary particulars will be sent without obligating or compromising you in any way. R. W. Bixby, Inc., 402 Lockwood Building, Buffalo, N. Y.

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SEND for Free Special Bulletin and learn how to increase your knowledge of practical railroad work and fit yourself for promotion. The Railway Educational Bureau, Omaha, Nebr.

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Take advantage of it.

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125 65,000 lb. Capacity BOX CARS; ALL REBUILT, in strictly first class condition; ready for immediate shipment.

GONDOLA CARS

25 100,000 lb. Capacity ALL STEEL, Double Hopper cars.
25 100,000 lb. Capacity, ALL STEEL, Flat Bottom cars.
80,000 lb. and 100,000 lb. NEW STEEL FLAT CARS.

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5 to 100 tons in weight, ALL TYPES, for all classes of service. Have over 50 rebuilt and ready for IMMEDIATE SHIPMENT.

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ATLANTA (Established 1889) GA.

Use the Classified Section, when in need of a man or looking for a position.

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1 50-Ton Shay Locomotive.
1 35-Ton Brooks Mogul Locomotive.
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3 28' Box Cars, 30 m. cap.
3 30' Flat Cars, 40 m. cap.
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70 ton (140,000) 41 ft. Flat Car.
3—Western 16 yd. Air Dump Cars.
35—Side Dump Ballast Cars.
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St. Louis

FOR SALE
ALL STEEL GONDOLA CARS

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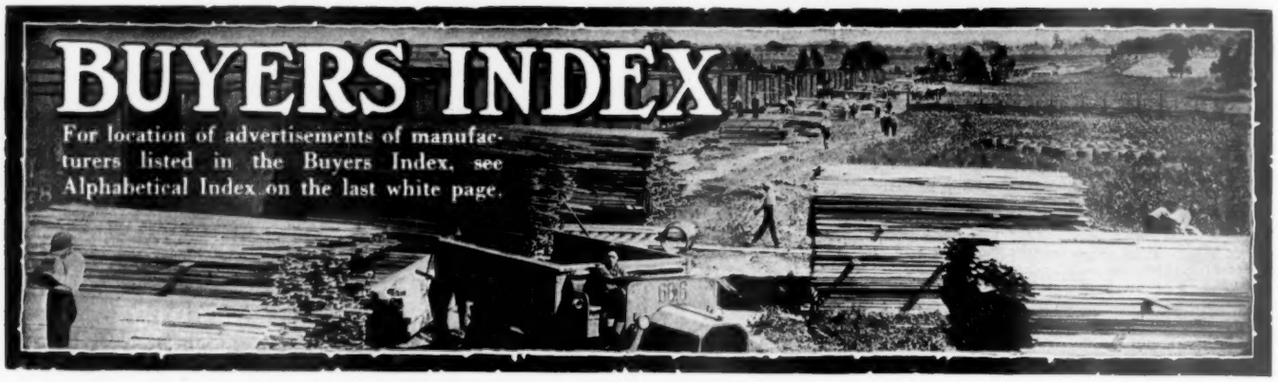
Twin hopper bottom
or
Flat Steel Floors.
Air Brakes.
Standard Safety Appliances.
Completely Rebuilt and Meeting all I. C. C. requirements.

For further information and photos of cars write or wire.

The Youngstown Equipment Company
Niles Ohio


BUYERS INDEX
For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last white page.

Acetylene, Dissolved.
Air Reduction Sales Co.

Air Lifts.
Ingersoll-Rand Co.

Air Reservoir Joints — (See Joints, Air Reservoir).

Angle Bars — (See Joints, Rail).

Angles, Channels and Tees—(See Shapes, Structural).

Arch, Locomotive Brick.
American Arch. Co.

Arresters, Lightning.
General Electric Co.
P. & M. Co., The.

Ash Conveyors.
Conveyors' Corporation of America.

Automatic Train Control.
Miller Train Control Corp.
National Safety Appliance Co.

Axles, Car and Locomotive.
American Locomotive Co.
Baldwin Locomotive Works, The.
Cambria Steel Co.
Standard Steel Works.

Barges, Steel.
American Bridge Co.
Pittsburgh-Des Moines Steel Co.

Barrels, Tumbling.
Whiting Corp.

Bars, Concrete Reinforcing.
American Steel & Wire Co.
Cambria Steel Co.
Carnegie Steel Co.
Illinois Steel Co.
Interstate Iron & Steel Co.
Midvale Steel Co.

Bars, Iron and Steel.
Cambria Steel Co.
Carnegie Steel Co.
Falls Hollow Staybolt Co.
Illinois Steel Co.
Ryerson & Son, Joseph T.
United Alloy Steel Corp.

Batteries, Electric Storage.
Safety Car Heating & Lighting Co.
Stone Franklin Co.

Batteries, Wet Cell.
Electric Storage Battery Co.

Bearings, Center.
Chicago Ry. Equipment Co.
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Symington Co., T. H.
Woods & Co., Edwin S.

Bearings, Journal.
Magnus Co., Inc.
More-Jones Brass & Metal Co.

Bearings, Side.
American Steel Foundries.
Chicago Ry. Equipment Co.
Fort Pitt Malleable Iron Co.
Miner, W. H.
Standard Car Truck Co.
Wine Ry. Appliance Co.
Woods & Co., Edwin S.

Benders, Rail.
American Chain Co.

Bending and Straightening Machines.
Ryerson & Son, Joseph T.

Billets, Steel.
Cambria Steel Co.
Illinois Steel Co.
Midvale Steel & Ordnance Co.

Blanks, Rolled Gear.
Cambria Steel Co.
Midvale Steel & Ordnance Co.

Blocks, Creosoted.
American Creosoting Co.
Central Coal & Coke Co.
International Creosoting & Construction Co.
Jennison Wright Co.

Blower Fittings, Automatic Smokebox.
Barco Mfg. Co.

Blow Off Line Joints, Roundhouse—(See Joints, Etc.).

Boilers, Locomotive.
American Locomotive Co.
Baldwin Locomotive Works.

Boilers, Water Tube.
Babcock & Wilcox.

Bolsters, Steel.
American Steel Foundries.
Illinois Steel Co.
Republic Railway Equip. Co.
Scullin Steel Co.

Bolts and Nuts.
Boss Nut Co.
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National Malleable Castings Co.
Russell, Burdsall & Ward Bolt and Nut Co.
Ryerson & Son, Joseph T.

Bolts, Patch.
Falls Hollow Staybolt Co.

Bolts, Track.
Illinois Steel Co.

Books.
Simmons-Boardman Pub. Co.

Booster.
Franklin Ry. Supply Co.

Booths, Telephone.
Dickinson, Inc., Paul.

Boring and Turning Mills, Vertical.
Niles-Bement-Pond Co.

Braces, Rail.
American Chain Co.
Cambria Steel Co.
Fort Pitt Malleable Iron Co.
Midvale Steel & Ordnance Co.
National Malleable Castings Co.
Ramapo Ajax Corp.
Q & C Co., The.

Brake Beams.
American Steel Foundries.
Chicago Ry. Equipment Co.
Parish & Bingham Co.
Republic Railway Equip. Co.

Brake Beams—Supports.
American Steel Foundries.
Chicago Ry. Equipment Co.

Brake Forging, Pins, Levers, Etc.
American Steel Foundries.
National Railway Appliance Co.
Schaefer Equipment Co.
Steel Car Forge Co.

Brake Heads.
American Steel Foundries.
Chicago Ry. Equipment Co.
National Malleable Castings Co.

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National Malleable Castings Co.
National Railway Appliance Co.
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Steel Car Forge Co.

Brake Shoes.
American Brake Shoe & Fdy. Co.
Fort Pitt Malleable Iron Co.
Railway Materials Co.
Weirbach Brake Shoe Co.

Brakes, Air.
Westinghouse Air Brake Co.

Brakes, Clasp.
American Steel Foundries.

Brakes, Electric.
Westinghouse Air Brake Co.

Brakes, Hand.
Miner, W. H.
Minich Ry. Appliance Co.
National Malleable Castings Co.
Wine Ry. Appliance Co.

Brick Locomotive Arch.
American Arch Co.

Bridge Builders.
Arnold Co.
Austin Co., The
Fowler, Chas. Evan.
Pittsburgh-Des Moines Steel Co.

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Blaw-Knox Co.
Brown Hoisting Machy. Co.
Browning Co.
Industrial Works.
Orton & Steinbrenner Co.

Buckets, Grab.
American Bridge Co.
Blaw-Knox Co.
Brown Hoisting Machy. Co.
Browning Co.
Hayward Co.
Industrial Works.
McMyler Interstate Co.
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Westinghouse Air Brake Co.

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Ferguson Co., H. K.
McLellan & Junkersfeld, Inc.
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Stone & Webster.
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Niles-Bement-Pond Co.
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Kerite Insulated Wire & Cable Co.

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Air Reduction Sales Co.

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Parish & Bingham Corp.

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Chicago Cleveland Car Roofing Co.
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Kirby-Bonner Lumber Co.

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Cambria Steel Co.
Western Wheeled Scraper Co.

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Cambria Steel Co.

Cars, Dump.
Cambria Steel Co.
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Cambria Steel Co.
Greenville Steel Car Co.
Ralston Steel Car Co.
Ryan Car Co.
Youngstown Steel Car Co.

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Fairbanks, Morse & Co.
Mudge & Co.

Cars, Industrial.
Whiting Corp.
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Fairbanks, Morse & Co.
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Baldwin Locomotive Works.
Midvale Steel & Ordnance Co.
National Malleable Castings Co.
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Fort Pitt Malleable Iron Co.
McConway & Torley Co.
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McConway & Torley Co.
Midvale Steel & Ordnance Co.
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Dearborn Chemical Co.
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Standard Coupler Co.
Symington Co., T. N.
Union Draft Gear Co.
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Steel Car Forge Co.

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Miner, W. H.

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Ingersoll-Rand Co.

Drilling Machines, Rock.
Ingersoll-Rand Co.
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Independent Pneumatic Tool Co.
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Robinson Co., Dwight P.
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Austin Co., The
Bush, Roberts & Schaefer.
Ferguson Co., H. K.
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Fowler, Geo. L.
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Gilmore, Thomas N.
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Smith & Co., C. E.
Stone & Webster
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White Eng. Corp., J. G.

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Austin Co., The
Bush, Roberts & Schaefer Co.
Ferguson Co., H. K.
Fowler, Geo. L.
Gulick, Henderson Co.
Hunt & Co., Robert W.
Muhlfeld, John E.
Smith & Co., C. E.

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Fairbanks, Morse & Co.
Ingersoll-Rand Co.
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Buffalo Forge Co.
Mudge & Co.
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Arnold Co.
Camel Co.
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Miner, W. H.
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Vanadium Corp. of America.

Ferro Tungsten.
Vanadium Corp. of America.

Ferro Vanadium.
Vanadium Corp. of America.

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Graver Corp.

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Graver Corp.

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American Locomotive Co.
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National Malleable Castings Co.
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Miner, W. H.
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Ryerson & Son, Joseph T.
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Forgings.
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Edgewater Steel Co.
Illinois Steel Co.
Midvale Steel & Ordnance Co.
Parish & Bingham Co.
Steel Car Forge Co.
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Forgings, Drop.
Steel Car Forge Co.

Forms, Steel, for Concrete Construction.
Blaw-Knox Co.

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Frames, Truck.
American Locomotive Co.
American Steel Foundries
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Frogs and Crossings.
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Ashton Valve Co.

Gates, Tail.
Morton Mfg. Co.

Gear Blanks, Rolled Steel.
Standard Steel Works.

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American Steel Foundries

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Safety Car Lighting & Heating Co.
Stone Franklin Co.

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Barco Mfg. Co.
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Industrial Works.
McMyler Interstate Co.
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International Creosoting & Construction Co.

Piling, Wood.
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Miner, W. H.

Pins, Coupler Knuckle.
Steel Car Forge Co.
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Baldwin Locomotive Works.
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Midvale Steel & Ordnance Co.
Pittsburgh-Des Moines Steel Co.
Ryerson & Son, Joseph T.

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Cambria Steel Co
Illinois Steel Co.
Interstate Iron & Steel Co.
Midvale Steel & Ordnance Co.
National Malleable Castings Co.

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Plows, Snow.
American Locomotive Co.
Jordan Co., O. H.
Q & C Co., The

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Mass. Mohair Plush Co.

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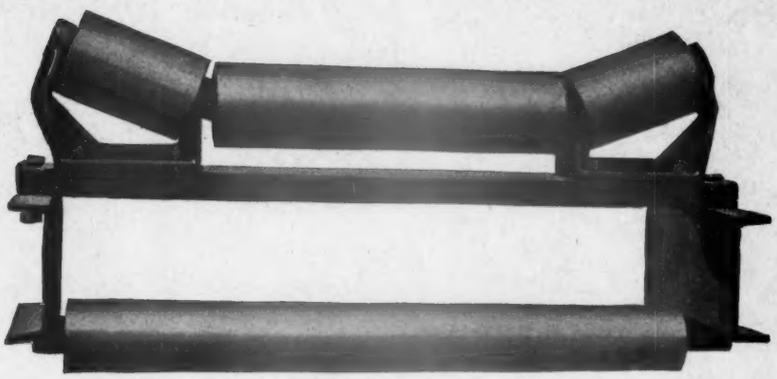

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The Brown Hoisting Machinery Co., *Cleveland, O.*
Branch Offices: New York, Chicago, Pittsburgh, San Francisco, New Orleans

BROWNHOIST

MATERIAL HANDLING EQUIPMENT

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More than pays for itself

The Berwick Electric Rivet Heater usually pays for itself *within eight to ten months* through actual cash savings.

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Write for the Berwick Catalogue and detailed information about electric rivet heating, rod heating, or any other metal heating in which you may be interested.

American Car and Foundry Company

165 Broadway, New York

Chicago **St. Louis**